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THE AGRICULTURAL GAZETTE OF CANADA

Vol. IX September-October, 1922 No. 5

STORAGE

LEADING TOPICS

The Lethbridge Experimental Station
Marketing Pure Seed
Cow-Testing and Its Value
Lessons from Egg-Laying Contests
Agricultural Instruction in Saskatchewan and Alberta
Veterinary Sanitary Science
The Ontario Veterinary College
Tree Planting on Prairie School Grounds
The Prince Edward Island Agricultural School
Agricultural Legislation and Appropriations, 1922

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA

The Agricultural Gazette of Canada is published bi-monthly, in English and in French, by the Dominion Department of Agriculture, Ottawa.

The aim of The Agricultural Gazette is to provide a source of information as to the policies and activities of the Dominion Department of Agriculture and of the Provincial Departments of Agriculture and of Education, so far as the work of the latter relates to Agricultural Education. Besides being a publicity medium, it constitutes a comprehensive record of the progress and development of departmental effort on behalf of Agriculture in Canada.

The Agricultural Gazette is not intended for general distribution. It it sent free to agricultural workers and teachers, including school teachers who have agricultural teaching qualifications; to members of parliament; to libraries; to the Press, and, as an exchange, to institutions in other parts of the Empire and in foreign countries.

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
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The AGRICULTURAL GAZETTE
OF CANADA

J. B. SPENCER, Director of Publicity
Wm. B. VARLEY, Editor

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OTTAWA

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MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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The AGRICULTURAL GAZETTE
OF CANADA

VOL. IX SEPTEMBER-OCTOBER, 1922 No. 5

DOMINION EXPERIMENTAL FARM SERIES

THE EXPERIMENTAL STATION, LETHBRIDGE, ALBERTA

BY W. H. FAIRFIELD, SUPERINTENDENT

IN the late summer of 1906 the Experimental Station at Lethbridge, Alberta, designed to serve the southern part of the province, was established. It is located three miles east of the business centre of the city of Lethbridge, and is traversed by the Crow's Nest branch of the Canadian Pacific Railway Company's line.

Owing to the extensive irrigation development that had already begun at that time in southern Alberta, the need for experimental work in connection with farming carried on under irrigation was recognized, and the farm was selected so that a part of it could be irrigated and the balance could be devoted to experimental work with non-irrigated or "dry land" farming. As a matter of fact, it could almost be said that two experimental farms were established, for the work on the dry and irrigated parts of the farm are quite distinct and have always been kept separate. Their object being not to compare the relative merits of the two systems but to study the individual problems connected with each.

The farm consisted of 400 acres of virgin prairie, and was donated, together with the water rights, to the Government by the Alberta Railway and Irrigation Company. One hundred only of the 400 acres were irrigable, but a few years later a pump was installed and the water for another 100 acres was pumped, so that at the present time one half of the farm is irrigated.

The season of 1907 was devoted to the breaking of the land, fencing and the erection of buildings. The first crop grown was in the season of 1908.

Dry Land

On the dry land the question of the best cultural methods has been given more attention and study than any other one subject. Combined with this and being part of it is the question of prevention of soil drifting and suitable rotations. Experiments with drought resisting forage crops, varietal tests of both spring and winter grains, and tests with different dates of seeding and varying amounts of seed have been carried out.

To aid in making a more extended study of the problems in connection with the best cultural methods to follow in the production of grain and other field crops under dry land conditions, a forty acre piece of land, adjoining the Station on the north, has been rented.

Irrigated Land

The necessity of investigational work in irrigation problems is quite apparent when the fact is taken into consideration that the irrigation works are either completed or in the course of construction for over one million acres of farm land in southern Alberta. The most profitable crops to raise, when to irrigate, how to irrigate, how much water to use, how often to irrigate, are some of the questions that are facing the farmers beginning irrigation, as well as those who have been living for some time on irrigated farms.

Experimental Station, Lethbridge, Alta.—Stacking alfalfa hay.

The Experimental Station is attempting to answer these questions, and it is gratifying to those in charge to realize the confidence the farmers have in and the respect they have for the work of the Station, as indicated by the inincreasing number of farmers visiting the station as well as the ever increasing number of letters of inquiry being received.

Crops and Live Stock

Under the head of field husbandry the experiments have indicated most clearly the value of alfalfa, not only demonstrating that it is an extremely profitable crop to raise but that it has, when ploughed up, great value in increasing the fertility of the soil for crops following it.

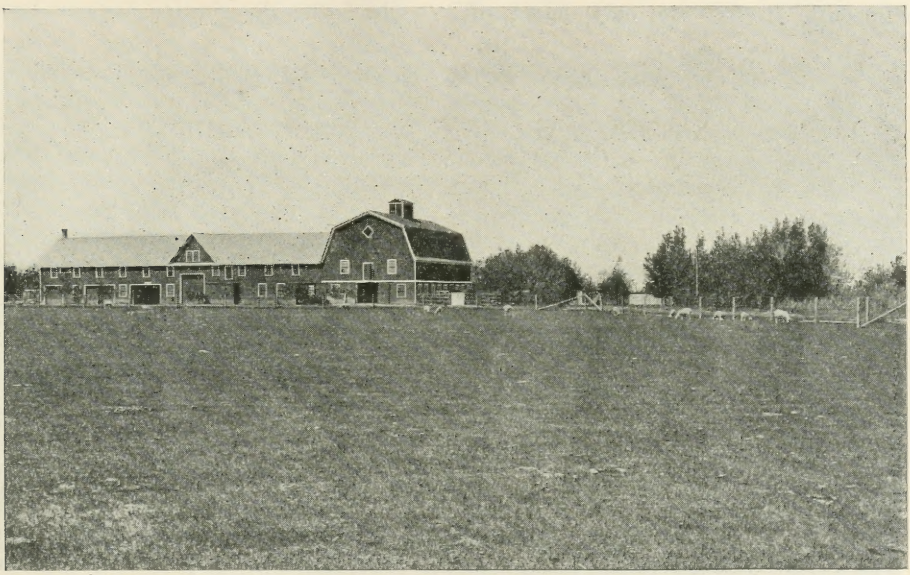
In animal husbandry considerable work has been done in winter feeding of steers and lambs, and with few exceptions these tests have demonstrated that farmers on irrigated land can obtain from $15 to $20 and over per ton for their alfalfa hay by feeding it on their farms in this way. This is of considerable importance to alfalfa growers for with the increasing area that is being seeded each year to alfalfa on irrigated land, the question of marketing is becoming more difficult. The Lethbridge district already produces 40,000 tons of alfalfa annually.

Pasturing Alfalfa

In connection with summer pasture experiments on irrigated land an interesting discovery has been made in regard to alfalfa. Although alfalfa will produce very much more feed per acre than any of the grasses, it has not been found safe to use for pasture for either cattle or sheep on account of the danger

from bloat. In the pasture tests carried out it has been found that where alfalfa is mixed with grass and there has been formed a good turf of some such sort as Kentucky Blue or Brome, etc., cattle and sheep may be pastured on it with impunity with no danger from bloat. Incidentally the alfalfa being mixed with the grasses doubles the carrying capacity of the pasture.

An experiment being conducted, and one that is being followed with interest by many farmers, is the pasturing of sheep on the Forest Reserve. The sheep



Experimental Station, Lethbridge, Alta.—Barn and implement house.

are shipped by rail to and from the Rocky Mountain Forest Reserve, being pastured there for the four summer months—during the time when pasture is difficult to obtain on an irrigated farm. Owing to the prices prevailing for mutton and wool for the past two seasons, since the inauguration of the experiment, the profits have not been altogether satisfactory.

Since the establishment of the Station, some experiments have been conducted in the duty of water, but owing to the lack of trained assistance it has been impossible to carry on these investigations in as thorough and detailed a manner as the importance of the subject would warrant. This year, however, with the appointment of an assistant during the past winter who has had special training in irrigation, it has been possible to inaugurate some carefully planned experiments in the use of water on alfalfa, timothy, mixed pasture grasses, wheat, potatoes, and sunflowers. The particular object of the experiments is to study the effect of the application of water to the plants at varying stages of their development rather than at arbitrary dates. At the time of writing, although the crops are but partly grown, some very marked and interesting results are observable.

Horticulture

The possibilities in horticulture, especially under irrigation, have been determined in large measure by the experiments carried out. It has been definitely shown that small fruits such as strawberries, currants and raspberries can be successfully grown commercially. In connection with raspberries it has been found that winter killing may be

avoided by covering the rows of canes with soil instead of manure or straw. The possibility of tree growth both for shelter and for ornamental purposes has been well demonstrated by the results obtained at the Station. Rows and clumps of strong vigorous trees, 30 to 40 feet and more high, now stand where there was bald prairie when the Station was started.

Poultry

The poultry plant is rendering, it is believed, good service. Careful pedigreeing work is being done and, as a result, a high-laying strain of Barred Plymouth Rocks, the only breed of poultry kept, is being developed. The demand for cockerels and hatching eggs is many times greater than the Station can supply. The Alberta Egg-Laying Contest which is being conducted at this Station, is doing a great deal to stimulate the interest of poultrymen in increasing the egg-laying capacity of their flocks.

Bee-Keeping

The work with bees has proved to be of considerable value. Alfalfa is the main, in fact the only, honey plant of any real value, but it's long season of bloom—from July 1 to the first frost in the fall—provides the bees with large quantities of honey. From a single colony as much as 407 pounds of extracted honey has been obtained in a season. The average production is usually well over 100 pounds. The principal problem in connection with bee-keeping is the question of successful wintering. Experiments in care and management, with particular reference to this problem, have been conducted, with the result that there is now considerable information available to bee-keepers and prospective bee-keepers in the district.

The Lethbridge Station has now been in active operation for fifteen years. From the beginning the work of the Station has been followed closely by a large body of the farmers in the southern part of the Province. The general settlement of southern Alberta, that is, the taking up of the land for grain growing rather than for ranching, was in progress at the time the Station was established. Incoming farmers visited the Station in large numbers, and these men have since then been turning to the Station for suggestions and help from time to time as new problems developed in their farming operations.

Tree growth at the Lethbridge Experimental Station.

THE CO-OPERATIVE MARKETING OF PURE SEED

Plans for the Efficient Merchandising of Seed Produced by Members of the Canadian Seed Growers' Association

BY GEO. H. CLARK, COMMISSIONER, SEED BRANCH

THE Canadian Seed Growers' Association constitutes an organization of experienced seed growers, many if not most of whom devote their principal efforts toward the multiplying and maintaining in their purity and productiveness the "Elite" stock seeds that are produced by expert plant breeders who are for the most part employed in connection with government experiment stations, both federal and provincial. Seed growers who are operating under the direction of the Association have come to be regarded as the important connecting link between the plant breeder and farmers in general. Without the service of our growers of registered seed, it is reasonable to conclude that much of the excellent results derived from the work of plant breeders would become dissipated and, in consequence, farmers in general would not receive the full benefit from their work.

Heretofore, local demand for registered seed absorbed a large proportion of the total quantity produced within the district where it was grown. The secretary, by means of an annual catalogue and replies to inquiries, has been able to supply a marketing intelligence service which in most years enables seed growers to distribute their registered and other good seed. The recent enlargement of the plan for registration has made it practicable to develop seed production centres with quite extensive acreage of seed crop under superior conditions of soil and cultural practices that are particularly favourable to the kind of crop. Thus the total production of Registered seed and of Extra No. 1 seed grown from registered seed, has been and is being increased in geometric ratio as compared with ten years ago. It is important that effective measures be adopted to ensure the efficient distribution and the general use of all the best quality of seed produced by our growers, and in addition that any surplus remaining in favourable years of production be made available for export. Our best qualities of northern grown seeds have come to be highly regarded in many of the States to the south.

Unfortunately, because of the want of proper organization, the distribution of Registered seed, and of Extra No. 1 grade of seed which is grown from registered seed, has not been fully satisfactory. It was this fact that led to the passing of a resolution at the recent annual meeting of the Canadian Seed Growers' Association, recommending the formation of organizations for assembling, cleaning, storing, financing, and marketing of superior quality seeds of all kinds of our staple crops; and that, pending the organization of a Canadian Seed Growers' Co-operative Association, the Seed Purchasing Commission be given authority to provide a service for selling the surplus of such seed.

The constitution and charter of the Canadian Seed Growers' Association do not provide the authority necessary to enable it to enter into the field of merchandising on behalf of its members. Being supported in part by the government, it would be quite improper for that Association to enter into competition with private companies engaged in the seed business. The government now has one fairly well established and experienced organization for the merchandising of seed grain, the Seed Purchasing Commission, and inasmuch as trading is not generally regarded as a proper function of a government, it is to be expected that as soon as co-operative endeavours in the assembling and

distribution of good seed have become sufficiently well developed to meet the very real needs of agriculture, particularly in the prairie provinces, the operations of the Seed Purchasing Commission may thereafter be discontinued as a governmental institution.

The provincial government of the province of Quebec several years ago established and now have an excellent assembling, cleaning and distributing plant at St. Rosalie Junction, Quebec. The provincial government of British Columbia have more recently developed and are in process of guiding the development of an assembling, cleaning and distributing plant at Penticton, B.C. The farmers' co-operative organization of the province of Prince Edward Island have an efficient seed warehouse and cleaning plant at Kensington, P.E.I. The grain growers of Saskatchewan have had under consideration for several years the setting apart and equipment of two or more of their elevators for the assembling, cleaning and distribution of Registered and Extra No. 1 seed grain. The latest very satisfactory information is that the Minister of Agriculture for the province of Alberta has indicated that for that province he will provide on the basis of service at cost, well equipped warehouse facilities for the assembling, cleaning and distribution of Registered and Extra No. 1 seed grain and other seeds that may be grown in the province of Alberta. In the early future there will be need for similar efficient plants for the assembling, cleaning and distribution of Registered and Extra No. 1 seed at Winnipeg, Port Arthur and Toronto. Their advantage to the seed growers and their pronounced benefits to farmers in general have been and will continue to be so obvious, that we may be reasonably sure of their early development at all centres where they are really needed and without the Canadian seed growers doing more than demonstrating their usefulness and the sound economy of their development and operation on the basis of service at cost. These special seed cleaning and distribution warehouses ought not to become a public charge, and assuredly will not become a public charge unless, as frequently happens, their development gains a momentum in excess of requirements, with the result of having warehouses where they ought not to be established.

During the recent session of Parliament much was heard about the pooling system for the selling of wheat. That system was in vogue for several years, and with much success in the province of Saskatchewan in the co-operative marketing of their dairy produce. Members of the Canadian Seed Growers' Association would be well advised carefully to consider the advantages that might accrue to them not only from their connection with a provincial or district seed growers' co-operative, but also from the adoption of the pooling system of selling their seed grain through the medium of their co-operative. It will be the privilege of any provincial or district seed growers' co-operative to license their warehouse under the Canada Grain Act, and to secure from any chartered bank financial advance on all of the seed grain that may have to be carried from autumn until the following spring. The merchandising efforts of provincial or district seed growers' co-operatives may with splendid advantage be reinforced by an interprovincial seed growers' co-operative which would provide the much needed service of distribution as a selling agency, particularly for interprovincial and export trade.

In the meantime the Seed Purchasing Commission will continue to function—at least Parliament secured that assurance from the Government while the estimates for the Seed Branch were under consideration. The Seed Purchasing Commission have since 1916 merchandised upwards of sixteen and a half million dollars worth of seed grain, and their operations have in no sense resulted in a net charge on the Treasury.

They have available to them the large Canadian Government interior terminal elevators which are operated on the basis of service at cost by the Department of Trade and Commerce. These elevators were not specially constructed for handling seed grain, although they are well equipped with cleaning machinery. Grain of commerce is moving into and out of them daily and it is only through the exercise of unusual care that the Seed Purchasing Commission have been able to handle through them the inferior grades of commercial seed grain which are composed of mixed or comparatively impure varieties.

It has been unfortunate that the Seed Purchasing Commission have not been in a position to assemble, clean and distribute Registered and Extra No. 1 grades of seed grain. As soon as provincial or district seed growers' co-operatives in the prairie provinces are able to deliver to the Seed Purchasing Commission proper warehouse receipts for seed grain of approved varieties, recleaned and in sacks, together with the official inspection certificate issued under provisions of the Seed Control Act, the Commission will be in a position to co-operate by providing efficient marketing service, including reasonable financial advance under the co-operative pooling system. The primary object of the Seed Purchasing Commission will be to secure for distribution as much as possible of Registered and Extra No. 1 grades of seed of the comparatively few kinds of varieties that are approved for distribution by them. It is considered unreasonable to expect that the Seed Purchasing Commission, or a Canadian seed growers' co-operative that may later come into existence, should undertake the organization and development of provincial or district seed growers' co-operatives, each of which will naturally be a separate financial unit. Whether the provincial or district seed growers' co-operatives that are already in existence, or that may be developed, will be in a position to co-operate with, or utilize the services of, the Seed Purchasing Commission or any other interprovincial selling agency that may be brought into existence, will of course depend on the constitution and the business practices of the provincial or district co-operative. Consideration of such matters may quite safely be left to those who are well experienced in co-operative endeavour as applied to business. Those interested in promoting provincial or district co-operatives may be depended upon to find the proper foundations for co-operative merchandising, not only in consideration of the relations that should exist between them and the seed growers whom they are to serve, but also between them and any central selling agency to whom they may look for service.

The service of official inspectors under the Seed Control Act will continue to be available for the official grading of all kinds of seed for commerce. Shipments of registered seed arriving at the central seed cleaning plant will have to be accompanied by a statutory declaration on the printed forms of the Canadian Seed Growers' Association signed by the seed grower, identifying the seed shipped by him with the seed crop for which he holds registration certificate from the Association. The official inspector may thereafter be depended upon to protect the best interests of the Association and its members, by adhering to the standard of quality that may be defined by the Association and enacted into law under the provisions of the Seed Control Act.

In this connection, it may be stated that an endeavour is being made to coordinate the established systems of grading seed grain and other seeds as between that employed by this Association and that as defined in the Seed Control Act. It is believed to be more simple from the viewpoint of the interested public and in the best interests of all concerned, that we should have in Canada one system for the nomenclature of quality in seeds, and that the terms that may be employed to designate qual-

ity shall be: (1) Elite stock seed, (2) Registered seed, (3) Extra No. 1, (4) No. 1, (5) No. 2, (6) No. 3, (7) Rejected. Inasmuch as Elite stock seeds may scarcely be said to be available in quantity for commerce, it is not considered necessary to safeguard the employment of that term under legislative control of the seed trade. It is, however, thought advisable to establish a legal standard for registered seeds and to protect the use of that term as applied to seeds of commerce in common with the inferior grades of seeds that have been established under the Seed Control Act. This is considered advisable, if not really necessary, in view of the contemplated activities looking to the development of a more satisfactory distributing service for superior quality seeds of all kinds of our staple crops.

Canadian farmers have become accustomed to securing service from the Department of Agriculture free of charge. They do not complain because the Department of Trade and Commerce levies a charge sufficient to cover the cost of the service of grading their grain for milling or feeding. It is quite probable that the service of inspection for Registered and Extra No. 1 seed grain that is assembled at central warehouses may be provided for a nominal charge sufficient for a few years to pay only a part of the cost of providing the service.

With the gradual further development of co-operative endeavour in the marketing of the seed grain produced by its members, the Canadian Seed Growers' Association will take a wholesome interest and extend whatever measure of support may be proper and helpful. We may be sure that its particular field of work will materially enlarge in proportion as the results of the work of our experienced seed growers are made more conveniently available to the farmers of Canada who have now been tutored for twenty years by the Association, and for much longer by other organizations, as to the advantages that accrue from the use of the best quality of seeds that can be produced.

LESSONS GAINED FROM EGG-LAYING CONTESTS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

IT is now nearly five years since the Experimental Farm started its first Egg-laying Contest in Prince Edward Island. Four years ago the Experimental Farm started seven egg-laying contests throughout the Dominion. Three years ago we started a contest in each Province, open to the Province, and one, called the Canadian, open to the world. At the present time we are operating ten contests, one for each Province, situated at one of the Experimental Farms or Stations in that Province, and the Canadian which is situated at Ottawa.

Egg-laying contests have for years been known merely as spectacular features. Canada was the first country to standardize them and to make them a medium for something other than purely advertising propositions.

The Record of Performance in Poultry was established by the Dominion Department of Agriculture four years ago. It is divided into two sections, "A" and "A.A." The latter comprises birds qualifying in the egg-laying contests.

The contests start on November 1 each year and continue for 52 weeks. At the end of that time the birds are sent home and a new contest begins. The number of birds, by provinces, in the 1921-22 contest was as follows:—Canadian, 600; Prince Edward Island, 200; Nova Scotia, 200; New Brunswick, 200; Quebec, 200; Ontario, 280; Manitoba, 200; Saskatchewan, 180; Alberta, 290;

British Columbia, 290. These birds are sent in by private owners; they are housed at one of the Experimental Farms, fed by the Farm, and the eggs retained. Reports are issued once a week, and other reports periodically throughout the year.

We have gained considerable experience during the last few years in conducting these contests, and each year we are becoming more efficient. This year we have had less trouble through the dissatisfaction of people who entered their birds than ever before.

The contests have proven that Canada is a good country for egg production. The reports of production given by the various pens in the contests compare very favourably with pens in other contests. Take the eight leading contests in America for the winter period November to April 17. The British Columbia contest at Agassiz comes out first with an average production of 78·4; Ontario second with 68·4 production and for third we get, Storrs, Connecticut, with 1,000 birds and a 66·4 production. Then comes the Canadian, with 600 birds and 65·5 production, followed by New Jersey; Vineland, with 2,000 birds and 63·8 production. The Vineland birds are yearling hens, so the comparison is hardly just. Following Vineland, comes Manitoba where it was once thought the winters were too cold to secure high production. The contest was held in Brandon, Manitoba, where the thermometer went down to 44 degrees below zero, and they had 63·1 production. The seventh place is held by Lethbridge, Alberta, with 62·2, and the eighth place by the North American Contest held at Milford, Delaware, where there were 500 birds with 60·5 production. Therefore, one of the lessons which the contests have helped us to learn is that we can produce winter eggs in quantities in Canada in spite of the cold climate, and that our climate is not a detriment to production.

Another lesson: High production is not always obtained from the heavy or general purpose varieties, for the light varieties have done exceptionally well in the winter months. The opinion was at one time quite general that the Mediterranean breeds were unsuited to the colder sections of Canada. Ottawa is one of the places where high production has been obtained from the Mediterranean breed. The Canadian contest gave an average for the heavy varieties of 83·5 and for the light varieties of 83, just half an egg more for the heavy varieties during the winter months than for the light varieties. Prince Edward Island, 50·5 for heavy; 56·4 for the light—the light breeds there beat the heavy breeds. Nova Scotia, 71 for the heavy; 53·9 for the light; New Brunswick, 64 for heavy and 61 for light. The Ontario contest which is situated at Ottawa along with the Canadian gave an average for the heavy breeds of 90·3 and 85·4 for the light; Manitoba, 72·3 for the heavy, 85·4 for the light; Saskatchewan, 76·3 for heavy, 47·6 for the light; Alberta, 74·6 for the heavy and 68·8 for the light; British Columbia, 95·3 for the heavy and 96·7 for the light. The average for the Dominion is 84 for the heavy and 80 for the light, and that covers November, December, January, February, March, April and half of May of the past winter.

Another lesson we have learned is that there are not nearly so many 200 egg hens in Canada as advertising matter would indicate. In view of the results obtained by the contests in the whole Dominion, it is quite evident that some people advertise higher production than they are able to substantiate. The average hen on the average man's place is not any better than the average hen which gets in the laying contest, nor do I think that the man who has advertised a high laying strain is more likely to get this high production than we are in the contest. The percentages in the several contests were as follows: The Canadian had 6·8 per cent of the birds entered that laid over 200 eggs; Prince Edward Island did not have one that

went 200 eggs; Nova Scotia had 2·4 per cent; Quebec had 1 per cent; Manitoba 9·5 per cent; Saskatchewan 1 per cent; Alberta 3·6 per cent, or an average in the whole Dominion of 4 per cent of the birds in all the contests at that time which laid over 200 eggs. British Columbia was not in the contest at that time. Take the contest for 1920 to 1921, the Canadian gave 11·3 per cent of the birds that went over 200 eggs. Prince Edward Island did not have any the first year but had 1·6 per cent last year; Nova Scotia 3·6; New Brunswick 10·3 per cent; Quebec had half of one per cent; Ontario 8·7 per cent; Manitoba 7·3 per cent; Saskatchewan 2 per cent; Alberta 5·2 per cent; British Columbia 37·3 per cent, or a total for last year in all the contests of 9·6 per cent over the 200 mark against 4 per cent the previous year. The contests, therefore, have indicated that there are not as many 200 egg hens in Canada as there were a few years ago.

Another lesson we have learned is that the contests are good mediums for advertising. This fact has led to a certain amount of misrepresentation in a few instances. We have endeavoured to overcome this difficulty by collecting as much information about the pens as we could from the owners with a view to finding out whether the birds were their own, whether they are bred the same as their own flock which they have at home, and if they do well, have they more at home of the same kind.

This is the fourth year for some of our contests, and we have learned that there are some consistent breeders in Canada, who year after year, have had pens in the contests and whose pens have done consistent work, though they may not be taking first place. The breeder who puts his pen in the contest year after year, giving a fair to good showing each year, is the class of breeder who is going to make a mark for himself. There are some breeders who rush a pen in and do some very spectacular work for the time being, but who may not have the best stock to breed from. Rather it is the man who puts in birds that will give a good account of themselves year after year who is valuable to the country.

These contests have indicated that the second lot of pullets from a high producing pen not bred by the person entering are usually not as good as the original stock. The owners did not use the best of judgment in the mating of the mothers. That is unfortunate. But because of that the egg yield of the birds in the contest has gone down, the same as the egg yield has gone down with the birds that were kept at home. A contest in anything which will stimulate importation of good material is a good thing, but what use is good stock if we do not keep it good.

COW-TESTING AND ITS VALUE

How One Herd Has Been Improved by This Means

BY A. H. WHITE, SENIOR DAIRY PROMOTER

SOME eleven years ago, J. G. Wait, Colborne, Ont., started to keep records of production of each cow in his herd. To-day, Mr. Wait's herd is an outstanding example of the results to be obtained through cow-testing where dairy records are used by the dairyman as a guide to his operations in breeding and feeding and selection.

At the end of the first year of testing in 1911, the average production of fourteen cows in this herd was only 5,438 lb. milk. At that time a test was not made for butter fat. In 1921, the average production of fifteen cows was 10,080 lb. milk and 371.3 lb. fat according to the records received at the office of the Dairy Branch. This is an increase of

nearly 100 per cent, and income has been raised from about $500 in 1911 to over $3,000 in 1921, an increase of over 600 per cent. Dairy records have certainly proved a great benefit to this man in his business.

After the first year of this work, Mr. Wait found some wide differences in the production of his individual cows. The highest production was 7,676 lb. milk while the lowest was 2,976 lb. milk. There were also several other cows which were not paying for the feed consumed. These cows were sold and others purchased to take their places and in 1913, the production per cow was increased to 6,967 lb. milk from eleven cows. In 1914, only eight cows were in the herd for the full year and the average production for these cows was 9,328 lb. milk. Thus after four years of careful selection of the best cows and a weeding out of the poor producers, Mr. Wait had eight cows which produced almost the same amount of milk as fourteen cows had produced during the year 1911. These results made for more economical production as the feed and labour costs were not so great while the income was nearly the same.

The increase in production during the first few years was due almost entirely to weeding out the poorer cows although pure-bred sires had been used in herd. From this time on, heifers from pure-bred sires were freshening and replacing the old cows or those found to be real boarders.

When records were first kept, this herd was a grade herd similar to those found on the majority of farms. They were a nondescript bunch of cattle with all sorts of grades and crosses. However, the pure-bred cow appealed to Mr. Wait and he started in early to purchase pure-bred Holstein cows. One of these cows has a total production of over 100,000 lb. milk in eight years or an average of 12,500 lb. milk per year, which is a very creditable record. Another foundation cow has a production of 54,656 lb. milk and 2,073.8 lb. fat in four years, an average of 13,664 lb. milk and 518.4 lb. fat per year.

After 1914, it was more difficult to obtain increases in production as it was impossible to buy the higher producing cows except for exceptionally high prices and Mr. Wait was content to build up his herd by using as good a sire as he was financially able to purchase. However, there was progress each year, and the highest average production per cow was reached in 1918 when eight mature cows averaged 12,547 lb. milk and 439 lb. fat. This was the first year records of butter fat records were kept and the tests were very good. The last few years, young heifers have been added to the herd and have decreased the average production for the whole herd, but the highest individual production was made in 1921 when one cow produced 16,319 lb. milk and 603·9 lb. fat during the calendar year.

In May of this year, Mr. Wait branched out and did some official testing. He put four of his cows on the seven-day Record of Merit test and had the satisfaction of having one of them head the list of mature cows with a production of 741.7 lb. milk and 26.31 lb. butter fat or 32.89 lb. butter in seven days. The other cows did well and all had records of over 22 lb. butter in seven days. His best cow was also on R.O.P. test and for the 365 day period had a record of 17,031 lb. milk and 760 lb. butter. These records are very creditable considering that they were made during Mr. Wait's first attempt at official testing and were made by cows which have been bred and raised by himself.

Mr. Wait is a good feeder and gives his cows every care, which tends towards increased production. He has two silos on the farm thereby insuring plenty of succulent feed and he feeds a grain ration of bran, shorts, oat chop, corn, oil meal, and cotton seed cake. These grains and concentrates with clover hay and silage make a well balanced and palatable ration, which has helped in

keeping up milk production. Mr. Wait also believes in feeding according to production, and has found the daily milk record a great help in apportioning his grain ration properly.

The value of using only good, pure-bred sires has been well demonstrated in the progress of this herd. At the present time, it is composed entirely of pure-bred Holsteins, and has been built up from two or three foundation cows. The daughters have proved to be better producers than their dams. Before selling off all his grades, Mr. Wait had some very high producing grade cows in the herd. Two grade Holsteins had average production records of over 12,000 and 11,000 lb. milk extending over a period of years. Such records as these demonstrate the value of the pure-bred sire even in a grade herd.

Nor has Mr. Wait been alone in the matter of herd improvement. There are three or four other farmers in the same district who can point to increased production due to selection, feeding, and the use of pure-bred sires, and these men have been guided in their work by the milk record sheet and Babcock tester. They have been testing for some years and have obtained results. In 1919, the average production of 61 cows in 6 herds was 8,623 lb. milk and 302.4 lb. fat; while in 1921, the average production of 53 cows in four herds was 9,413 lb. milk and 335.6 lb. fat, showing a decided increase in the last two or three years, and an average production fully 100 per cent greater than that of all dairy cows in Ontario or in Canada.

Such are the results that can be secured through a wise use of the knowledge obtained by keeping a record of milk and fat production. These men are not situated any more favourably than many others, and have to build as they go along. They have, however, built on sane lines and have worked to reach a standard that they had set for themselves. Nor have they worked blindly and by guess work as many farmers are doing. They knew each individual cow, fed her according to production and used only such sires as they knew came from stock that could improve their herds. When such improvement can be obtained in one herd, surely cow testing is worth while to all dairymen who are anxious to improve their herds.

THE FERTILIZERS ACT 1922

BY G. S. PEART, B.S.A., CHIEF OF MARKETS AND FERTILIZER DIVISION, SEED BRANCH

THE provisions of the New Fertilizers Act differ from those of *The Fertilizer Act, 1909,* and amendments of 1919, in detail more than essentials, though certain new provisions have been added as will be shown.

Under the Act of 1909 and the amendments of 1919, "fertilizer" was defined as any manufactured manure that contained nitrogen, phosphoric acid or potash. The new Act prohibits the sale of any material as "fertilizer" unless such material contains a total of 12 per cent or more of the plant food substances, nitrogen, phosphoric acid and potash, singly or combined; furthermore the nitrogen, phosphoric acid or potash content must not be claimed as present in a fertilizer or be a part of the total of 12 per cent unless they are present in minimum quantities as follows: atomic nitrogen 2 per cent, phosphoric acid (available P_2O_5) 5 per cent, potash (K_2O soluble in water) 2 per cent.

The inclusion of this provision makes it unlawful for any person to sell in Canada under the name of fertilizer, lime in its various forms or other soil conditioners or materials that contain unimportant amounts of nitrogen, phos-

phoric acid or potash. Basic slag, or natural rock phosphate, or a mixture of both, are not subject to this provision, but must be sold true to their respective names, unadulterated, and the fineness to which they are ground must be guaranteed, as well as the percentage of phosphoric acid present.

The old Act provided a system of registration for each brand, and an annual license to sell. Under the new Act, these two phases have been combined in the form of an annual registration for each brand, with the following exemptions:—

(*a*) Fertilizer that is manufactured subject to a prescription signed by the purchaser;

(*b*) The following fertilizer, when sold in a commercially pure state, true to name, and containing not less of the plant food substances as specified:

Nitrate of soda, 15 per cent nitrogen;

Sulphate of ammonia, 20 per cent nitrogen;

Superphosphate (acid phosphate), 16 per cent available phosphoric acid;

Basic slag (Thomas phosphate), 10 per cent total phosphoric acid and 80 per cent fineness;

Natural rock phosphate of stated origin, 25 per cent total phosphoric acid and 80 per cent fineness;

Sulphate of potash, 48 per cent potash soluble in water;

Muriate of potash, 48 per cent potash soluble in water;

All other fertilizers manufactured or imported for sale, including those mentioned in the foregoing list, provided their plant-food substance content is less than the amount specified, must be registered. All mixed fertilizer must be registered. The registration forms prescribed for the purpose may be had on application to the Seed Commissioner.

As under the old Act, each bag or package containing fertilizer must bear a printed tag or label, or the package itself may be branded, with the following information: the name and address of the manufacturer or importer; registration number of the registered fertilizer; the brand name of the fertilizer; and the guaranteed analysis. If the fertilizer is sold in bulk, this information must be stated on the invoice of sale. The new Act provides also that it must all be printed on one side only of the tag or bag, without additional information on that side.

The information of guaranteed analysis required differs from that under the old Act in that the percentage of nitrogen may be stated only under two heads, that is, water soluble nitrogen and total nitrogen. The terms "available" nitrogen and nitrogen equivalent to ammonia must not be used. On the other hand, if organic materials, such as hoof, horn, hair or refuse is present in the fertilizer, 80 per cent of its total nitrogen content must be soluble in neutral permanganate (A.O.A.C. Methods). Otherwise the percentage of these organic materials containing insoluble nitrogen must be stated in the information of guaranteed analysis. Phosphoric acid may be stated under two heads only, total phosphoric acid and available phosphoric acid, and potash only as potash soluble in water. In the case of basic slag or natural rock phosphate, or a mixture of both, the statement must also contain the percentage of fineness to which it is ground.

All fertilizer, whether bought on prescription or exempt from registration or registered, is subject to this labelling provision of the Act.

Another provision, not found in the old Act, prohibits the sale of fertilizer that contains any substance in sufficient quantity that would be poisonous to plant life when applied to the soil. This applies particularly to fertilizer that contains anhydrous borax.

The Act also gives the Minister of Agriculture power to make regulations deemed to be necessary in making effective any of its provisions, and to appoint an advisory board to recommend to him such regulations. This board has been appointed, and consists of

three representatives of the fertilizer manufacturers of Canada, three Canadian agricultural chemists, and three representatives of the fertilizer users.

At the first meeting of the board, held at Ottawa on July 10 and 11 last, the following regulations bearing on labelling and brand names, were recommended and have since been adopted.

Regulations adopted

"All the information required to be stated under Section 4, clause 1, of this Act shall be plain, legible and indelible.

"The tags or labels which bear the information required to be stated shall be printed in not less than 11 point print, or when the information is branded or marked on bags, barrels or other large packages, the printed characters shall be not less than one inch long, provided that on small packages containing ten pounds or less of fertilizer, the information printed thereon shall not be less than 11 point print.

"When the fertilizer is sold or offered for sale in the province of Quebec, the printing of the information required under Section 4 of this Act shall be done in the French language on one side of the tag, and in the English language on the reverse side.

"The information given in the statement of guaranteed analysis, as required under Section 4 of this Act, shall be set forth as follows:—

In the order as provided under Section 4 (1) of this Act;

The percentage of the plant food substance shall be printed, branded or marked directly opposite and to the right side of the name of the plant food substance.

"When a fertilizer contains only one of the plant food substances, nitrogen, or phosphoric acid, or potash, its brand name shall include the trade name of the fertilizer material, e.g., "Nitrate of Soda," etc., provided that when its plant food substance content is fortified with another material containing one and the same plant food substance, the names of both the materials shall be included in the brand name, e.g., "Basic Slag and Florida Phosphate," etc.; or,

"When the fertilizer consists of one fertilizer material (not mixed with another) and is guaranteed to contain two or three of the plant food substances, nitrogen, phosphoric acid and potash, the brand name of the fertilizer shall include the name of the material, e.g., "Tankage," etc.; or,

"When the fertilizer is made by mixing two or more materials which contain different plant food substances, nitrogen, phosphoric acid and potash, the brand name shall not include the name of any one of the materials unless the names of all the materials are included.

"The brand name shall not include the name or other designation of any field or garden crop or group of crops."

Any person in Canada, who is affected by the Act or Regulations, has the right to place any matter bearing on the control of fertilizers before this board for consideration. Such persons may appear before the board in person or address the board through the office of the Minister.

Copies of the Act and Regulations may be had on application to the Publications Branch, Dominion Department of Agriculture, Ottawa.

Inspection

Inspectors appointed under *The Seed Control Act* and *The Feeding Stuffs Act* are responsible for the enforcement of *The Fertilizers Act* in their respective districts.

The interested public have the right to apply at any time to an inspector to take official samples from any fertilizer that appears to have been sold or offered for sale in contravention of the provisions of the Act; or, any person may take samples of fertilizer and submit them to an official analyst for official analyses,

and the certificate of the official analyst is *prima facie* evidence before the court. The samples must be taken in strict accordance with the sampling provision of the Act.

Applications for the service of inspection in the respective inspection districts should be addressed "Dominion Seed Branch," as follows:—

Maritime Provinces—Truro, N.S.

Quebec—Post Office Building, Quebec City.

Eastern Ontario—Ottawa, Canada.

Western Ontario—36 Adelaide St. E., Toronto.

Manitoba and Saskatchewan—173 Portage Ave. E., Winnipeg, Man.

Alberta and British Columbia—Calgary, Alta.

AGRICULTURAL LEGISLATION AND APPROPRIATIONS, 1922

DOMINION OF CANADA

A synopsis of the Acts relating to Agriculture passed at the 1922 session of the Dominion Parliament is given below, together with the details of the appropriations for Agriculture for the years 1921-22 and 1922-23 respectively.

Act to amend the Oleomargarine Act, 1919.—The time during which oleomargarine may be manufactured in or imported into Canada is extended from August 31, 1922, to August 31, 1923, and the time during which oleomargarine may be sold in Canada is extended from March 1, 1923, to March 1, 1924.

Act to Amend the Animal Contagious Disease Act.—This Act has been amended by changing the amounts that may be awarded as maximum values for livestock slaughtered under the Act. These values are now as follows:—

"In the case of grade animals, one hundred and fifty dollars for each horse, sixty dollars for each head of cattle, and fifteen dollars for each pig or sheep; and in the case of pure-bred animal three hundred dollars for each horse, two hundred dollars for each head o cattle, and fifty dollars for each pig or sheep."

The amount of compensation granted in each case is two-thirds of the amount of the valuation. The effect of this amendment is to reduce the valuation and compensation for animals destroyed for glanders, hog cholera, tuberculosis, and other diseases, to correspond mo nearly than it has done with the reduced values of livestock since the war. It will also enable the money granted by Parliament for this purpose to be spread over a larger area and thus benefit a greater number of livestock owners.

The Fertilizers Act, 1922.—A full statement of the provisions of the new Act will be found in a special article in this issue.

An Act to regulate the sale and inspection of root vegetables.—This Act provides as follows:—

For the grading of potatoes offered for sale in Canada, 'Canada-a,' 'Canada-b' and 'Canada-c' qualities.

For the grading of Onions offered for sale in Canada, 'Fancy,' 'Choice,' 'Standard,' 'Boilers,' and 'Sample' qualities.

For the special marking of bags, closed barrels and closed crates or carload shipments in bulk, of potatoes or onions.

For the establishment of standard definitions and grades for potatoes and onions.

For the obliteration of any marks on packages when used again.

For inspection, and how falsely marked packages may be dealt with.

For the establishment of a standard barrel for potatoes.

For the sale of vegetables by weight.

It prohibits the sale for human consumption of potatoes or onions so diseased or otherwise depreciated as to render them unfit for this purpose.

Fraudulent packing is forbidden.

No person shall sell or offer, expose or have in his possession any potatoes for sale by the closed barrel unless such barrel is well and properly filled.

The powers of inspectors are defined, and penalties for violation of the Act are prescribed.

The provisions of the Act do not apply (*a*) to new potatoes when shipped between June 1 and September 30, inclusive; (*b*) to seed potatoes; (*c*) to green onions; (*d*) to potatoes or onions for export.

DOMINION AGRICULTURAL APPROPRIATIONS

	1921-22	1922-23
Civil Government	$ 689,075 00	$ 780,455 00
Experimental Farms	1,272,639 50	1,325,000 00
Entomology	26,000 00	28,000 00
Administration and Enforcement of the Destructive Insect and Pest Act	194,000 00	240,000 00
Dairying	175,000 00	175,000 00
Cold Storage Warehouses	26,000 00	51,000 00
Fruit	145,000 00	157,000 00
Health of Animals, administration of the Animal Contagious Diseases Act, etc	1,710,000 00	1,785,000 00
Publications	34,500 00	28,500 00
International Institute of Agriculture	10,000 00	15,000 00
Live Stock	1,000,000 00	1,060,000 00
Seed, Feed and Fertilizer Control	260,000 00	275,000 00
Administration of the Agricultural Instruction Act	10,000 00	20,000 00
Grant, National Dairy Council	3,000 00	3,000 00
Grant, National Horticultural Council	.....	5,000 00
Stock Grazing and Feeding (Re-vote)	50,000 00	41,503 65
Total	$5,605,214 50	$5,989,458 65

AGRICULTURAL INSTRUCTION GRANT, 1922-23

THE allocation of the grant made by the Dominion under *The Agricultural Instruction Act* to the provinces of Canada for the fiscal year ending March 31, 1923, is given below, the schedules of allotment as to the expenditure of the grant having been incorporated in the Agreements entered into by the Dominion Government and the governments of the provinces, in each case represented by the Minister of Agriculture.

ONTARIO

Agricultural Colleges and Schools

1. Ontario Agricultural College:		
Salaries and expenses, additions to staff, maintenance		$ 8,000 00
2. Agricultural School and Farm:		
(*a*) Capital expenditure	$89,000 00	
(*b*) Administrative and teaching staff, maintenance, purchase of stock, machinery, repairs, services, expenses and equipment	35,000 00	124,000 00

Instruction and Demonstration

3. Agricultural Representatives	$139,603 26
4. Extension work in Household Science in rural communities	1,200 00
5. Co-operation and markets, investigation of marketing conditions for Ontario crops, educational work in ocnnection with the marketing of farm products, including organization of co-operative societies	4,000 00
6. Demonstrations in connection with vegetable growing N	3,500 00
7. Women's Institute work, including courses in cooking, sewing, etc.	2,800 00
8. Lectures on horticulture	1,000 00
9. Demonstration work on soils	7,200 00
10. Beekeeping	1,000 00
11. Drainage work	4,000 00

Elementary Agricultural Education

12. To provide for and to encourage the teaching of agriculture, manual training as applied to work on the farm, and domestic science in High, Public, Separate and Continuation Schools, and in Universities, to be available for grants, services, expenses, and equipment, and travelling and living expenses of teachers, inspectors and others in attendance at Short Courses or other educational gatherings, and to be paid out on the recommendation of the Department of Education	40,000 00
	$336,303 26

QUEBEC

Colleges and Schools of Agriculture

1. Grants and allowances,— Macdonald College, School of Agriculture, Ste-Anne de la Pocatière, Oka Institute	$ 75,000 00
2. School of Veterinary Science, building and extension	5,000 00

Instruction and Demonstration

3. Animal Husbandry	9,000 00
4. Poultry Husbandry	18,000 00
5. Horticulture	35,000 00
6. Dairying, educational work in cheese and butter-making	5,000 00
7. Agricultural Representatives	69,000 00
8. Seed Selection, clover plots and demonstrations	9,000 00
9. Bee-keeping—Educational work	7,000 00
10. Drainage	6,000 00
11. Maple Industry—Maintenance of schools and allowance to students	4,000 00
12. Short Courses and Lectures	9,113 76

Elementary Agricultural Education

13. To promote the teaching of Agriculture in Academies, Rural and Normal Schools, Teacher Training, School Gardens and School Children's Exhibits	10,000 00
14. To promote the teaching of Domestic Science in Academies and Normal Schools—Grants, lectures and inspection	10,000 00
	$271,113 76

MANITOBA

Agricultural Representatives	$12,000 00
Dairy Work	7,000 00
Poultry Work	5,000 00
Boys' and Girls' Club Work	15,000 00
Short Course Work	14,000 00
Home Economics	14,000 00
Soil Analysis and Survey	1,000 00
Bee-keeping	4,000 00
Killarney Demonstration Farm	4,000 00
Contingencies and Miscellaneous	1,113 11
	$77,113 11

SASKATCHEWAN

College of Agriculture

Staff Salaries—Research and Extension Service	$19,209 49
Women's Work—Homemakers' Clubs	7,500 00

Instruction and Demonstration

Demonstration Trains	20,000 00
Agricultural Representatives	6,209 50
Veterinary Short Course	500 00

Elementary Agricultural Education

Agricultural Instruction in Public, High and Normal Schools, Household Science, Training of Teachers, Nature Study	20,709 49
Grants to Schools operating departments in Household Science	3,000 00
Expenses of officials at School Fairs	3,000 00
Post Graduate Course in Agriculture, Agricultural Scholarships	1,600 00
	$81,728 48

ALBERTA

Schools of Agriculture	$40,000 00
School Fairs	15,000 00
Women's Work	8,000 00
Poultry Extension Work	3,965 62
	$66,965 62

BRITISH COLUMBIA

Seed work	$ 500 00
Silo Demonstrations	500 00
Horticultural Demonstrations and Competitions	1,000 00
Fruit Packing and Pruning Schools	1,000 00
Poultry	1,250 00
Dairy and Cow-testing	9,000 00
Bee-keeping	5,000 00
Boys' and Girls' Clubs	1,250 00
Agricultural Journal and Publications Branch	5,000 00
Pathological and Entomological Investigations	1,500 00
Miscellaneous	199 06
Agricultural Instruction in Public, High and Normal Schools, training of teachers, grants	20,000 00
University of British Columbia, College of Agriculture, Extension and Investigation	23,000 00
	$69,199 06

NOVA SCOTIA

College of Agriculture—Interest and sinking fund, Science Building	$ 8,000 00
College salaries and maintenance	25,000 00
Agricultural Representatives	10,000 00
Short Courses	1,000 00
Dairying	7,000 00
Poultry	1,500 00
Soils, Crops, Fertilizer, and Drainage	3,000 00
Fruit Growing	1,000 00
Women's Work	5,000 00
Entomological Work	7,500 00
Elementary Agricultural Education	12,000 00
Contingencies	716 69
	$81,716 69

NEW BRUNSWICK

1. Agricultural Schools, salaries and maintenance	$ 1,000 00
2. Agricultural Representatives	11,460 00
3. Bee-keeping	2,800 00
4. Soils and Drainage	5,500 00
5. Horticulture	6,000 00
6. Short Courses	1,250 00
7. Live Stock	5,100 00
8. Dairying	6,000 00
9. Poultry	3,000 00
10. Entomology	600 00
11. Agricultural Societies	3,100 00
12. Women's Institutes	6,500 00
13. Elementary Agricultural Education— Agricultural Instruction in Public, High, and Normal Schools, Household Science, Teacher Training, grants and allowances	11,800 80
	$64,110 80

PRINCE EDWARD ISLAND

Agricultural buildings,—equipment and maintenance	$ 1,050 00
Director and Agricultural Representatives	4,300 00
Short Courses	500 00
Drainage, Soils and Crops	2,869 22
Live Stock and Dairying	4,500 00
Poultry, Horticulture, Beekeeping and Co-operative Marketing	500 00
Women's Institutes	3,630 00
Elementary Agricultural Education, Agricultural Instruction in Public and High Schools, Training of Teachers, Allowances, Grants, Maintenance of Rural Science Department, Prince of Wales College	11,900 00
Contingencies and Miscellaneous	2,500 00
	$31,749 22

THE IMPERIAL FRUIT SHOW, 1922

THE Imperial Fruit Show, 1922, will be held at the Crystal Palace, London, England, October 27 to November 4.

Collection of Entries and Entry Fees—The same arrangements as last year will be followed, and the Fruit Branch, Department of Agriculture, Ottawa, will receive all Canadian entries and collect all entry fees for the competitive British Empire and Overseas classes.

Closing of Entries—All entries and fees for the competitive classes must be in the hands of the Fruit Branch on or before September 25, in order that they may arrive in England not later than October 2.

Delivery of Exhibits—Exhibits must be delivered at the Exhibition Building, Imperial Fruit Show, Crystal Palace, London S.E., not later than October 23.

Growers, Associations of Growers and Exporters: may exhibit in the Overseas Section. This will provide exporters shipping to the British market with the opportunity of taking advantage of the advertising involved in prize winning in this section.

Judging—The judging of the British Empire Section will be done by a Board of three judges—one expert box packer from Canada, one from the British Ministry of Agriculture and one neutral.

Information—Full information may be obtained on application to the Fruit Branch, Department of Agriculture, Ottawa.

PART II

Provincial Departments of Agriculture

THE AGRICULTURAL INSTRUCTION GRANT IN SASKATCHEWAN

THE Agricultural Instruction Act was introduced at a time when vast areas in Saskatchewan had been only a short time occupied, and a great deal of extension work in agriculture was necessary because of the fact that many of the pioneer settlers were unfamiliar with agriculture under Saskatchewan conditions. This imposed heavy responsibilities upon the College of Agriculture in extension work, in research work and in the training of workers for both of these lines. The administrative work of the Department of Agriculture also was greatly increased, while the Department of Education, with the increase of an average of one school district every school day for several years, was equally busy.

The advent of the Agricultural Instruction grant with the opportunity it gave for assisting these organizations in furthering their work was, therefore, an important event; and—needless to add—one that was much appreciated by those to whom the work was great and the labourers few. The late Dr. C. C. James and his successors very readily perceived our local problems and gave approval to our proposals for the use of the Federal grant in helping to meet them.

The grant was at first divided equally between the College of Agriculture and the Department of Agriculture, but later, with the development of special agricultural instruction under the auspices of the Department of Education, the annual increases in the grant were apportioned to the Department of Education until it received an amount equal to the allotments to the Department of Agriculture and the College of Agriculture.

The following is a summary of lines of work financed from the grant in Saskatchewan:—

(a) College of Agriculture
- Staff salaries, research, teaching, and extension;
- Women's work, Homemakers' Clubs, etc.;
- Post-graduate scholarships in Agriculture.

(b) Department of Agriculture
- Instruction and demonstration in Animal Husbandry, Dairying, Field Husbandry, Co-operative Organization;
- Demonstration trains;
- Veterinary short courses;
- District Representatives.

(c) Department of Education
- Agricultural instruction in public, high and normal schools;
- Promotion of boys' and girls' clubs;
- School fairs.

College of Agriculture

The use of the Agricultural Instruction grant by the College of Agriculture has been along the definite line of providing additional staff for the College in order that the institution would be able to train young men for important positions in agricultural work, such as agricultural representatives and teachers of agriculture in secondary schools. It was also understood that these men would devote a certain amount

of time to different forms of extension work, as well as giving attention to their duties in research and in teaching. About four-fifths of the $27,000 appropriated to the College of Agriculture was spent for staff salaries and expenses. The remainder of the grant to the College was used for carrying on women's work.

The Homemakers' Club is the name of the organization through which extension work for women is carried on in Saskatchewan, and the supervision of the Homemakers' Clubs is a branch of the Extension department of the College of Agriculture. There are now some 150 Homemakers' Clubs, and the work of the Director includes a variety of duties in advising and assisting in connection with the management of the Clubs, the holding of meetings and a variety of technical questions in regard to homemaking.

For a number of years a short course for young girls from farm homes has been held at the University in June. Each agricultural society is entitled to send two girls, who receive board and lodging at the University and assistance from the Department of Agriculture in the payment of a portion of their railway fares. Circulating libraries are also operated by this branch of the Extension department in connection with Homemakers' Clubs, Women Grain Growers' organizations, etc.

During the past four years a portion of the grant has been reserved for Research Scholarships to be used by graduates of the College of Agriculture in further fitting themselves for work in agricultural research and instruction.

Department of Agriculture

The use of the grant by the Department of Agriculture has varied during the ten year period. At the outset a portion of it was used to provide additional men for field work in connection with animal husbandry, dairying and field husbandry, and in providing a staff for the Co-operation and Markets branch during the first few years of its existence.

Officials of the Department are primarily charged with administrative duties, although it is frequently difficult to differentiate between educational phases of their work and those that are administrative. As an illustration of this may be mentioned the administration of *The Agricultural Aids Act,* under which sales of stock are made to farmers on credit terms and propaganda carried on by the branch to encourage the use of better sires.

The work in connection with dairying included the financing of a part of the programme for the Dairymen's Annual Convention, and extension work in promoting the better breeding and better feeding of dairy herds, the care of milk and cream on the farm, and means and methods of marketing.

In connection with Field Husbandry, the work originally included the supervision and direction of a large number of agricultural secretaries employed and financed by Rural Municipalities. It also included efforts to promote the use of better seed and in the identification of noxious weeds.

In connection with the Co-operative Branch of the Department, demonstrations were first made in the marketing of wool, and the methods were so successful that eventually the plan was adopted by The Canadian Co-operative Wool Growers, an organization of producers operating throughout the Dominion.

Stock, poultry and eggs are other products upon which co-operative marketing effort has been applied.

These phases of Departmental work are now financed solely from Provincial funds, so that an equivalent sum has thereby been released for other activities.

Demonstration trains have, with the exception of one year, been carried on since 1914. In this undertaking there has been co-operative effort between the railways, the College of Agriculture, the Department of Agriculture and, more

recently, the Department of Education. The railway companies have provided trains free of charge and operated them at their own expense. The cars have been equipped very largely by the College of Agriculture, and to a lesser extent by the Departments of Agriculture and Education. The staff was contributed chiefly by the College of Agriculture. The usual period of operation annually was five weeks. The trains made two stops a day, and the total number of persons reached by one of these trains in a season would average over 30,000. Means were thus provided for answering specific questions in connection with the farming industry.

A Veterinary Short Course is held each year under the direction of The Saskatchewan Veterinary Association, and assistance is given from the Agricultural Instruction grant to the extent of $500 in furnishing an eminent veterinarian, who conducts clinics and demonstrates methods of conducting surgical operations.

Agricultural Representatives: At the outset a portion of the grant was used in paying salaries and expenses of four Representatives, but with the outbreak of the War these men enlisted for active service and the organization was temporarily suspended. This work is now being resumed.

Department of Education

As there are over 4,000 public schools in this province and agriculture is a subject of study for all the upper grades, the question of training teachers is a very vital one.

The immensity of the problem made it appear advisable to begin the work of agricultural instruction by appointing instructors in the Normal schools who would be able to give to the teachers in training somewhat of the agricultural point of view in the teaching of that subject in the public schools. Later this plan was extended so as to include the placing of instructors in a number of the high schools from which a considerable proportion of the future teachers are graduated. The object of this, of course, was to react in a satisfactory manner upon the boys and girls in the public schools.

The Agricultural High School has not been introduced in Saskatchewan, and consequently the use of the grant insofar as the Department of Education is concerned consisted in the payment of salaries of specialists in connection with the normal schools, and later in giving grants to high schools employing agricultural teachers.

In regard to Household Science, similar work has developed. A special feature of these activities has been the three-week short courses provided at various centres, which resulted in the establishing of a group system whereby a number of contiguous districts have engaged a special Household Science teacher.

From its inception in 1909 the whole School Fair movement has been directed by the Department of Education, and special effort has been put forth to develop the Agricultural and Household Science phases of the work. In 1910 the organization and direction of boys' and girls' clubs was made a part of the work of the Department of Education because of the intimate relation of these clubs to the boys and girls attending the public schools. Last year 275 school fairs were held, and 62 centres have fully organized Boys' and Girls' Clubs. None of this work is subsidized by cash grants, but is directed by officials whose salaries and expenses are paid from the Agricultural Instruction grant. The fund is also used to supply judges for these Fairs. The Rural Education Association has developed as the best local organization to promote and conduct School Fairs and the Boys' and Girls' Clubs, since it secures and holds public interest on the part of parents and others.

AGRICULTURAL INSTRUCTION IN ALBERTA

Summary of Activities to Date

Schools of Agriculture

At the conclusion of the Dominion fiscal year on March 31, 1923, the Agricultural Instruction Act will have been in operation for a period of ten years. Results of the work accomplished under the provisions of this Act in the Province of Alberta have been particularly successful. The administrative work has been taken care of entirely by the Alberta Department of Agriculture. As far as possible an endeavour has been made to confine the work performed under the Act strictly to agricultural education. At the commencement of the operation of this Act, the Province adopted a policy whereby schools of agriculture were established in different parts of the Province. These schools were located on farms which are a half section in extent. Three schools were established in 1913 and three more in 1919. These schools have been operating successfully, having had a total attendance of 2,568 students. The courses for boys include instruction in all subjects closely related to agriculture, and cover a period of two years. There is also a course for girls in household science covering the same length of time. The funds received through the Instruction Act are used principally in the operation and maintenance of these schools.

District Agriculturists

Through the funds supplied from this source it has been possible for the Department to establish a system of District Agriculturists. Several men have been placed in different localities throughout the Province, and have done some effective work in directing the agricultural policy of the district in which they are working. Pig clubs, calf clubs and school fairs have been organized in a large number of places through the efforts of these men, aided by some of the teaching staff of the schools of agriculture during the summer months.

Extension Service

Under the Institute Branch of the Department, short courses in agriculture for farmers have been held. These courses have extended over periods ranging from three days to two weeks. Several demonstration trains have been operated which were equipped with exhibits designed to give information respecting improved methods of agriculture and household economics. A staff from the Department accompanied each of these trains and gave lectures at stated periods each day.

Women's Work

Through the financial assistance rendered by the Instruction Act, a large development has been possible in Women's Extension work. At the time the Act was brought into force, the Women's Institute organization of the Province had just come into being. It has now developed to the point where there are about 400 local organizations with a membership of about 15,000 women. Extension lecturers and demonstrators are supplied to each of these institutes at least once a year. Short courses extending over periods of two weeks each are operated by the staff of the Department where such courses are applied for. These courses embrace such subjects as dressmaking, millinery, cooking, nursing, etc. The Women's Extension Branch also conducts a system of circulating libraries for the use of local institute organizations.

A retrospect of the work carried on through the assistance given by the Instruction Act, convinces one that this type of co-operation between the Federal and Provincial Departments of Agriculture is highly desirable from the standpoint of work actually accom-

plished. The Provincial Department has had the most courteous and considerate treatment from Federal officials at all times. The proposed programme of work has been discussed carefully on many occasions with the officer in charge. No difficulty has been experienced in reaching a decision as to the exact work to be undertaken. The Province of Alberta sincerely hopes that provision will be made for the development of this work on an even larger scale than heretofore.

WOMEN'S CLUBS IN THE PROVINCE OF QUEBEC

AFTER learning the principles of domestic science and agriculture in domestic science schools and convents of higher teaching, the girls and young women of our rural districts in the province of Quebec are organized into clubs under the name of "Women's Clubs" (Cercles de fermières). The first of these clubs was established in 1915. There are to-day seventy clubs, including 4,740 French-Canadian farmers' wives and daughters, under the general supervision of Mr. Alphonse Désilets, B.S.A., whose headquarters are at the provincial Department of Agriculture, Quebec.

In seeking to promote the economic interests of mankind, the essential part played by woman and the influence that she exercises upon the vocation of children should not be forgotten. Under intelligent management by devoted nuns, the domestic science schools endeavour to influence women to remain on the farm. They do this by training dutiful wives, thrifty housekeepers and experienced helpers for the "man with the hoe." However, it is only a small number, as yet, of farmers' daughters who go to these centres of science and practical training. The majority of the women and girls in our rural districts have yet to be reached, and the women's clubs are the means by which this work can be done. The fundamental idea of this undertaking is to keep our population on the land, to protect it against the lures of the city that attract our rural youth, and to direct this youth towards its natural and normal vocation by fostering a liking for family life, for farm life and for the parish or community life. This movement, which has for its motto "Cling to the home and to the farm," has therefore a double object: to attach woman to the home by indissoluble ties, by making pleasant and easy the accomplishment of her duties as housekeeper, wife and teacher, and to keep on the land our sons and daughters by making rural life more attractive. The Quebec Department of Agriculture gives a liberal assistance to local organizations that will take part in this useful, patriotic and social work.

The means employed by the clubs are practical, limited in number and well defined; the aim (*a*) to make more attractive and easier for the woman the accomplishment of her moral and material duties towards her husband, her children and herself; (*b*) to show her and her family how indispensable and how health-giving the work of the farm is; (*c*) to make her the champion and main support of the community organization, maintained in the peace and the love of the traditions that have safeguarded our race.

The accomplishment of this programme is entrusted to local councils of supervision, constituted of enlightened women—mothers of families or persons whose conduct and authority ensure sufficient influence for the success of this work.

The provincial Department of Agriculture gives material assistance through its domestic science division, supplying

a general director and teachers experienced in domestic science, in the care of children and in woman's work in agriculture. Each club receives from the Department an annual grant covering the expenses of administration and permitting the organization of competitions and similar work. A large quantity of vegetable seeds and flowers seeds, of eggs for hatching, of pure-bred fowls, of bee-hives and bee material are distributed annually by the Department, and encouragement is given to the reorganization of domestic textile industries for wool and flax.

On the other hand, the clubs organize courses in domestic science, cooking, sewing, hygiene, care of children, and nursing the sick. One day each month is set apart for studies. Agricultural community days are arranged as well as mother's days and all other manifestations likely to keep up the brotherly and patriotic sentiment in healthy religious tradition.

A general congress of women's clubs is held every three years; one was held in 1919 and one is arranged for this year.

The clubs are supervised by the provincial councils, and they have an official organ in "La bonne fermière," a domestic science and agricultural review for women, which is published every three months.

The main provisions of the statutes are as follows:

Each club is administered by a Board of Directors composed of a president, a vice-president, a secretary, a treasurer, a librarian, a lecturer and two councillors.

All women and girls taking an active interest in agricultural work are eligible as members of the club, after being presented by the Board of Directors and accepted by the majority of the members of the Board. The annual membership fee is not less than fifty cents.

For the study and the diffusion of good methods of agriculture and domestic science, the members of the club divide into committees, each charged with the study and promotion of a special line of work.

THE ONTARIO VETERINARY COLLEGE

BY C. D. McGILVRAY, V.S., M.D.V., PRINCIPAL

IN recognition of the importance to the livestock industry of ensuring the highest possible standards of animal health, the Ontario Department of Agriculture is establishing at Guelph an up-to-date and fully equipped institution for the purpose of training young men for the veterinary profession.

This institution, the Ontario Veterinary College, is affiliated with the University of Toronto, and is one of the oldest and most favourably known on the American continent. It has received students from all parts of the English-speaking world, and its graduates are highly regarded, many of them having attained considerable prominence. The College buildings are new and modern throughout, with the best of facilities and equipment for scientific instruction. The purpose of the College is essentially that of a teaching institution for the proper training of students for a degree in Veterinary Science. The prescribed course consists of four college sessions and leads to the degree of Bachelor of Veterinary Science (B.V. Sc.), which is granted by the University of Toronto.

The College is at present accredited by the Department of Agriculture of Canada and the United States Department of Agriculture. Graduates of accredited colleges are eligible for appoint-

ment as veterinary inspectors in Canada and the United States, in compliance with the Civil Service Regulations, and to membership in the American Veterinary Medical Association, and to register and practice in the various Provinces and States in conformity with their requirements.

Inauguration of the College

The available records indicate that in the year 1861 the then Upper Canada Board of Agriculture considered it necessary to take steps to have inaugurated a suitable institution for the education and proper training of young men as Veterinary Surgeons. They wisely foresaw the needs and advantages of this to safeguard the health of farm animals, thus protecting and encouraging livestock development in the future.

The late Hon. Adam Fergusson, the Chairman of the Board, and the late George Buckland, Professor of Agriculture at the University of Toronto, were particularly interested in the matter. In furtherance of the project Professor Buckland visited Scotland and consulted Principal Dick of the Edinburgh Veterinary College. He recommended Andrew Smith, M.R.C.V.S. of Ayr, Scotland, who had recently graduated with honours in veterinary science, as a suitable person to be entrusted with the founding of a veterinary college in Canada. As a result the Ontario Veterinary College was first established in 1862 at Toronto as a private enterprise under the direction of the late Principal Andrew Smith, F.R.C.V.S. For a few years the classes were conducted in the Agricultural Hall at the corner of Queen and Yonge streets. In 1869 a special building for college purposes was erected on Temperance street. The success of the school became assured from the beginning by a yearly increase in the attendance, exceeding expectations and requiring more adequate accommodation from time to time. In 1876 the original building was enlarged, and to meet further demands a spacious new building was erected by Principal Smith in 1889 on Temperance street, which was used until 1914, when a large modern college was constructed on University avenue by the Government.

Ontario Veterinary College.—Front elevation of the main building recently completed at Guelph, Ontario.

Establishment as a Government Institution

During the year 1908 the interests of Principal Andrew Smith in the College

were acquired by the Province of Ontario. It thus became a government institution to be continued as the Ontario Veterinary College under the direction of the Minister of Agriculture and to be maintained by annual appropriations from the Legislature.

The late E. A. A. Grange, V.S., M.Sc., was then appointed principal and continued in that capacity until the year 1918. The Hon. Nelson Monteith, Minister of Agriculture, the late C. C. James, B.A., LL.D., Deputy Minister of Agriculture, and Dr. J. G. Rutherford, C.M.G., then Veterinary Director General and Live Stock Commissioner for Canada, were largely instrumental in having the College taken over by the Government.

Subsequently, under the direction of the late Hon. James Duff, Minister of Agriculture, the Government erected a new and well equipped college building on University avenue, which was occupied during the year 1914.

Affiliation with the University

Incidental to the transfer of the College to government ownership and direction, the course was lengthened, and affiliation with the University of Toronto was arranged whereby certain graduates with matriculation standing could receive the degree of Bachelor of Veterinary Science. During the year 1919, under the direction of the Hon. George S. Henry, Minister of Agriculture, the Act respecting the College was amended by the Legislature as regards qualifications for the degree. As a result a more definite and closer affiliation with the University of Toronto was effected for conferring the degree, and its curriculum with matriculation was adopted leading to the degree of Bachelor of Veterinary Science, and for the degree of Doctor of Veterinary Science.

Expansion of Veterinary Science

With the incidental transition during the period of the World War, the rapid urban growth, the increased demand for food-producing animals, the expansion of veterinary science and its field of usefulness, it gradually became apparent that the centre of a large city was in some respects no longer the best place for the College to fulfil its manifest obligations.

In this connection it is worthy of note that when veterinary colleges were first established the activities of the profession were largely directed to the horse in health and disease. The education and training of prospective candidates for the profession had to be conducted preferably at centres where the number of horses was the greatest and steadily increasing, as in large cities. Coincidently, the other classes of farm stock, namely cattle, sheep, swine, and poultry, constituting the food-producing animals, have been increasing in importance, and present a much wider sphere of opportunity than formerly. Veterinary education, training and practice, though concerned as before with the horse, is confronted with additional demands and increasing obligations in connection with general live stock problems, in conserving the health of animals, controlling disease, safeguarding the public health against unwholesome food supplies, and the maintenance of a sanitary service to enable an export trade to be continued in live stock, meats, and allied food products. To meet the various exigencies it was decided to establish a new institution at a location providing for greater expansion and wider facilities than were available in the centre of a large city, the idea in mind being to retain urban advantages and in addition to secure closer contact with agriculture and animal industry.

The New College

After carefully considering the essential requirements of veterinary education, training and practice, the Government on the advice of the Hon. Manning W. Doherty, Minister of Agriculture, decided to establish a more adaptable institution at Guelph, in the centre of

one of the best live stock districts in Canada. Suitable grounds were provided and the erection of the new college buildings was begun during 1921, and their completion assured for the session commencing the first of October, 1922. The location, buildings and equipment combine in making what is generally considered to be one of the finest institutions of the kind on the American continent.

Since the college has been acquired by the Government and placed under the direction of the Minister of Agriculture, it has received a large measure of support and encouragement under each succeeding regime. It has been possible to develop a wider outlook and broader educational policies from this source, as well as from the University of Toronto with which it is affiliated.

Location of the College

The Ontario Veterinary College is favourably situated on "College Heights," at Guelph, Ontario, which is a leading educational centre, and the surrounding district is known as one of the best agricultural and live stock sections in Canada. The location is one that offers and combines all the advantages of the city with the attractions of sub urban surroundings. The College is within easy walking distance of the centre of the city, and has the benefit of a good street car service. Guelph is a modern city with a population of about eighteen thousand, and is only forty-eight miles from Toronto and about twenty-five miles from Hamilton. It has a splendid train service and close railway connection with Toronto by the Grand Trunk railway, the Canadian Pacific railway, and the Toronto Suburban Electric railway.

The Ontario Agricultural College and Experimental Farm is also situated on "College Heights," and comprises about seven hundred acres of land with a large group of magnificent buildings. The Veterinary College directly faces the grounds and campus, which are generally considered to be among the most beautiful on the continent. The well kept lawns, walks and drives, with the evergreens, ornamental trees and shrubbery all combine in creating attractive surroundings.

While the Veterinary College and the Agricultural College are separate and self-governing institutions, nevertheless their being in close proximity to each other affords many mutual advantages. The attendance of several hundred young men and women makes the social features of student life very congenial and provides for friendly rivalry in sports, athletics and other contests.

Grounds, Buildings and Equipment

The grounds are ideally located on "College Heights," fronting the main avenue known as the Brock or Hamilton road. The buildings are set back about one hundred feet from the road in front, which is paved and lined on each side with a row of large trees, making a very desirable avenue approach. The main building of the Veterinary College is a handsome new three-story structure fully modern throughout in arrangement, in facilities and in equipment. The exterior is designed in the "Modern Renaissance" style, and is particularly pleasing with grey sandstone and plum coloured tapestry brick facings. In outline it comprises a central portion one hundred and fifty feet in length, with two wings one hundred and thirty feet in length, extending on each side. Wide stone steps make an imposing entrance to the central portion, which is surmounted with a handsome cupola. A wide corridor extends the full length on each floor, and with the stairs and elevator permits ready access throughout. On the main floor are situated the executive offices, faculty room, assembly hall, library, reading room, class rooms, and museum. The ground floor has a students' entrance at each end connected by a wide corridor. On this floor are the students' sitting and recreation rooms, coat room, post

office, pharmacy laboratory, class room, dispensing room, instrument room, consulting office, clinical amphitheatre with surgical ward, and dressing room. The third floor contains the fraternal room, three class rooms, the Zoology, Histology, Pathology, Parasitology, Bacteriology, and Anatomical laboratories, with adjoining preparation rooms, staff offices and ward for small laboratory animals. All of the class rooms and laboratories are exceptionally well lighted and ventilated, and with the complete equipment and modern conveniences throughout provide many advantages for the comfort and well being of the student.

Class Rooms

There are six separate class rooms, each providing seating accommodation for over one hundred students. The lighting comes from the left side and rear of the student, thus avoiding any glare and shadow effects. Each room has ample black board facilities, and the seating is suitably arranged to enable the students to write lecture notes. Provision has also been made whereby use can be made in the lecture rooms of a projector and lantern for demonstration purposes, showing illustrations, lantern slides and microscopic preparations.

Laboratories

There are four large special laboratories assigned to practical work in Pharmacy, Anatomy, Zoology, Histology, Pathology, Parasitology, and Bacteriology.

The Pharmacy laboratory is on the ground floor adjacent to the clinical amphitheatre. It is conveniently arranged, well ventilated, suitably lighted, and individual benches with the necessary equipment are provided for the use of students. It is adapted for lecture and laboratory instruction, with accommodation for a class of about one hundred. A smaller adjoining room serves as a preparatory laboratory for research work and for the compounding and dispensing of material required for class purposes.

The Anatomical laboratory occupies one of the wings on the third floor, and is considered to be one of the largest and most complete of the kind. The lighting, ventilation and sanitary arrangements have been specially considered making it very adaptable for anatomical studies and post mortem examinations. The floor is concrete, sloped to drains, the walls finished in hard cement, smooth surfaced, and the dissecting tables are of white enamelled metal. An elevator connects it with the ground floor, enabling animals to be easily and readily transported up or down as desired. A commodious dressing and wash room is also available for the use of students.

The Zoology, Histology and Pathology laboratory extends around part of the front and one end of the third floor. The Parasitology and Bacteriology laboratory is similarly arranged at the other corner of the building. As both of these laboratories are of the same design and arrangement they may be conveniently described together. Being placed at each corner, window light is available from two sides and, with a large skylight in the centre, a maximum of natural light is secured. Each laboratory provides accommodation for a class of over sixty students at a time and is arranged on the unit plan with individual bench accommodation. A complete laboratory outfit is furnished each student including microscope and other necessary apparatus used in the preparation of tissue sections, the mounting and preparing of slides and making of culture media. The general equipment is complete and modern in every respect including microtomes, parafin baths, autoclaves, Arnold and hot air sterilizers, incubators, centrifuges, refrigerators, media cabinets, and other laboratory conveniences. Connected with each laboratory are two smaller laboratories

for the use of the instructors in the preparation of material and for research work. A small animal ward is conveniently located adjacent to the laboratories for research and experimental purposes.

Clinical Amphitheatre

The clinical amphitheatre is located in one of the wings on the ground floor. The seating is arranged in elevated sections providing a full view during demonstrations and operations. The equipment includes operating tables for large and small animals, restraining stocks and stalls. Hot and cold water is provided with wash basins and sinks conveniently placed. Connecting with the ampitheatre is a special surgical ward and a dressing room. The instrument room, dispensary and consulting room are also in direct communication, so that the whole arangement is very complete.

Veterinary Hospital

The Veterinary Hospital is a substantial two-story building situated near the main college building. It consists of a central portion with projecting wings so as to provide separate sections for the different classes of live stock, and has accommodation for over forty animals. The sections for horses and cattle are situated at each end of the central portion and comprises both open and closed stalls to accommodate over twenty animals comfortably. The sections for sheep and swine are contained in the projecting wing and provide accommodation for over twenty animals. The section for small animals is arranged for on the second story with suitable kennels for dogs and cats. The stable fittings, lighting, ventilation, and drainage have been specially considered, in keeping with modern requirements. Outside yards and paddocks are available for the exercising of animals.

PROVINCIAL AGRICULTURAL LEGISLATION AND APPROPRIATIONS, 1922

ONTARIO

An Act to Aid in the Grading and Packing of Fruits.—Provision is made whereby a grant not exceeding twenty-five per cent of the appraised value may be made out of funds appropriated by the Legislature for that purpose to any association for acquiring or erecting buildings for the grading, packing and storing of fruits grown by its members. The maximum grant shall not exceed $1,500, and the plans and location must be approved by the Minister of Agriculture. Ownership is vested in the association but buildings cannot be disposed of without the Minister's consent. This use of the buildings is allowed to outside growers, not members, on terms that may seem reasonable. An annual statement is to be submitted to the Minister. Repayment of the grant relieves the association of all conditions and limitations imposed. The Minister is given authority to decide all matters of doubt or dispute as to the workings of the association or the interpretation of the Act.

An Act to Amend the Community Halls Act.—This amendment removes the condition under which a Hall or Athletic Field must be provided within the township in which it is vested. Cases have arisen, where because of the existence of a community park or a lake just outside the confines of the township, the above provision is desirable.

An Act to Amend the Ontario Farm Loans Act.—Subsection 2 of section 25 of *The Ontario Farm Loans Act,* 1921,

is amended by striking out the figures "$1,000" in the second and fifth lines thereof, and substituting instead in each case the figures "$2,000."

An Act to Amend The Agricultural Development Act.—Subsection 1 of section 10 of *The Agricultural Development Act,* 1921, is amended by adding at the end thereof the following clauses:

(*d*) To pay off encumbrances, in which cases loans shall not exceed 40 per cent of the valuation;

(*e*) For the purpose of providing tile drainage.

An Act to incorporate the Ontario Co-operative Dairy Products, Limited.—Producing dairymen and others interested in the permanent progress of the dairy industry have for some time past felt and voiced the need for better marketing facilities for their products. In response to this sentiment, the Minister of Agriculture for Ontario, Hon. Manning Doherty, at the recent session of the Legislature, introduced a Bill to incorporate the Ontario Co-operative Dairy Products, Limited, and this Bill has now become law. The effect of this Bill is to put power into the hands of the producing dairymen to organize in such a way as to control their product from cow to consumer. It makes possible the organization of a large central selling company on a thoroughly co-operative, sane, business basis.

AGRICULTURAL APPROPRIATIONS

	12 months ending October 31, 1922	12 months ending October 31, 1923
Civil Government	$ 119,550	$ 119,100
Agricultural and Horticultural Societies	208,394	195,850
Live Stock Branch	137,700	124,200
Institutes	35,800	35,800
Dairy Branch	184,800	157,300
Fruit Branch	97,500	96,500
Agricultural Representative Branch	167,000	167,000
Ontario Veterinary College	36,060	37,060
Western Ontario Experimental Farm	16,500	20,000
Miscellaneous	130,450	118,950
Ontario Agricultural College	590,960	576,680
	$1,724,714	$1,648,440

NOVA SCOTIA

Such agricultural legislation as was passed by the Provincial Legislature of the Province of Nova Scotia during its session of 1922 was confined to amendments to Acts already in force. These were as follows:

An Amendment to the Sheep Protection Act.—In cases where the owner of a dog destroying sheep is unknown or is unable to pay compensation, the amendment simplifies the procedure by requiring only one sheep valuer instead of three, as formerly, who shall make the inquiry and fix the amount of compensation. To safeguard this procedure, provision is made for the reviewing of the case before a regular session of the county council in cases where there is dissatisfaction with the award of the valuer.

The Act for the Encouragement of Agriculture is amended so as to provide that the sum of $25 shall be retained by the Provincial Treasurer out of the amount granted to county exhibitions. The amounts so retained shall constitute a fund from which grants may be made upon the recommendation of the Secretary for Agriculture, the Superintendent of County Exhibitions and the President of the Farmer's Association to assist county exhibition boards in

defraying deficits due to rain or other uncontrollable causes.

The Act for the Encouragement of Dairying is amended to allow Inspectors appointed to enforce the provisions of *The Cream Grading Act* (now in force), free access to cream while in transit as well as when it arrives at the creamery or cream station.

AGRICULTURAL APPROPRIATIONS

	1920-21	1921-22
Agricultural Societies	$ 20,000 00	$ 20,000 00
General Agriculture	46,826 00	49,441 66
College and Farm	48,000 00	44,309 79
	$114,826 00	$113,751 45

BRITISH COLUMBIA

The following legislation relating to Agriculture was passed at the first and second sessions of 1921 of the Legislature of the Province of British Columbia:—

Agricultural Act Amendment Act, 1921.—This amendment enables associations or societies duly incorporated and carrying on work of substantially the same character as that carried on by Farmers' Institutes to obtain stumping powder and explosives for land clearing and other agricultural purposes on similar terms and conditions as those that have been granted for many years past to Farmers' Institutes solely.

Animals Act Amendment Act, 1921.—This amendment makes provision for penalties in connection with the violation of the section of the Act relating to swine and stallions running at large, or beef bulls over six months old, except in the latter case where a special proclamation of a district shall have been made for bulls for a good beef type over one year old to be at large.

Brand Act Amendment Act, 1921.—The amendment in this case substitutes a new scale of fees for those formerly in effect.

Goat Breeders Protection Act, 1921.—This Act interprets the phrase "pure-bred" with regard to goats and makes provision as to persons keeping for service any bucks unless pure-bred. Exceptions of two and three year periods from the commencement of the Act are provided for in the case of bucks which have pedigrees showing descent from pure-bred sires or pure-bred grandsires.

Mosquito Control Act Repeal Act.—This Act repealed the Mosquito Control Act of the year 1919. The former Act, which was also applicable to gophers, was not found to be workable in practice, in the case of mosquitoes owing chiefly to the large areas involved which would require drainage and considerable expense by the Public Works Department for which the local assessment provided in the Act would not have produced sufficient funds to finance the project. Two gopher control districts had been formed under the Act in the Slocan valley but no action had been taken.

Apiaries Act Amendment Act, 1921.—The chief interest in this amendment lies in the deletion of the clause in the Act of 1919 which provided for the annual registration of beekeepers and the payment of a graduated fee from $1.50 to a maximum of $5. This regulation had given rise to considerable irritation amongst large numbers of the smaller beekeepers, and the revenue produced therefrom did not have a very material bearing on the total expense involved in the extra number of inspectors appointed.

Co-operative Associations Act Amendment Act, 1921.—This amendment re-

peals the section in the original Act dealing with the distribution of profits of a co-operative association, the chief feature being the setting aside of not less than 10 per cent of the net profits each year as a reserve fund.

Goat Breeders Protection Act Amendment Act, 1921.—The amendment is a rectification of an error in the original Act, in which the singular person was used, thereby failing to cover the maternal ancestors.

AGRICULTURAL APPROPRIATIONS

	1921-22	1922-23
Minister's Office	$ 12,940 00	$ 13,190 00
General Office	34,996 00	38,176 00
Horticultural Branch	93,540 00	104,712 00
Live Stock Branch	73,462 00	67,472 00
Statistics	4,720 00	4,520 00
District Agriculturists, etc	16,270 00	16,270 00
Workshop and Shipping Office	3,200 00	3,180 00
Miscellaneous Grants, etc	149,150 00	132,150 00
Total	$388,278 00	$379,670 00

PRINCE EDWARD ISLAND

One Act relating to Agriculture was passed at the last session of the provincial legislature, namely an amendment to the *Act to incorporate the Prince Edward Island Dairy Association.* The amendment in question provides that all cream delivered to a creamery must be graded and paid for according to grade. Three grades are admitted, i.e., special, first and second. Creameries are required to pay a premium of not less than two cents per pound butter fat for special grade cream, and of not less than three cents for first grade. Dairy inspectors are empowered to take test samples of cream either at the producer's farm or in transit or at the creamery and to examine and retest.

AGRICULTURAL APPROPRIATIONS

Departmental expenses and contingencies	$ 2,950 00
Printing, Stationery, etc	1,000 00
Exhibitions and Live Stock Judging	10,000 00
Farmers' Institutes and Educational Work	4,000 00
Dairying, Poultry and Field Crops	1,550 00
Vital Statistics	1,000 00
Agricultural High School and educational work	4,000 00
	$24,500 00

NOTE.—For the agricultural legislation and appropriations of the province of Quebec, see page 227, May-June issue. For the provinces of New Brunswick, Saskatchewan, Alberta, and Manitoba, see pages 307-313, July-August issue.

SUMMER COURSES IN AGRICULTURE

NOVA SCOTIA

THE Nova Scotia Department of Agriculture and Agricultural College have in the past conducted short courses at the College and winter short courses at some of the larger centres here and there over the province, but never before has there been any serious endeavour to carry these out into the country.

This summer, between June 23 and July 7, short courses were carried on at twelve points in Cape Breton. The method followed was somewhat after the Chatauqua plan, one group of lecturers and instructors arriving on the first day and another on the second.

On the first day Principal Cumming, W. A. MacKay, Dairy Superintendent.

J. P. Landry, Poultry Superintendent, gave two lectures or demonstrations each, the evening session concluding with motion pictures of an educational character. On the second day at each place Professor Trueman gave a demonstration of live stock judging, from ten o'clock until noon. In the afternoon, Professors Trueman, Harlow and Cunningham lectured on various live stock and agricultural problems. In the evening lectures were given along similar lines, concluding, as on the first day, with motion pictures illustrating farming and stock raising operations.

In addition to these subjects, Miss Macdougall, Superintendent of Women's Institutes, and Miss Elizabeth Ellis, her assistant, conducted special courses of instruction for women, during the morning and afternoon of each day.

The attendance at all but two points was of a record character, reaching on several occasions upwards of 400 persons. The average was 250. Interest in practically every district visited ran high and full advantage was taken of the opportunity to gain useful information on farming problems. The whole venture is regarded by those who had it in hand as an unqualified success.

In the opinion of Dr. Cumming and his associates, perhaps the most significant factor in efforts of this kind is the presence or absence of a community hall. Again and again the benefits of such a meeting place appeared. It was equally evident that communities lacking such facilities were suffering from a serious handicap. At Boisdale, for example, the people are very fortunate in possessing a splendid two-story community hall, capable of accommodating four hundred or more people, and built upon simple but effective architectural lines. It was easy to conduct a short course in such a building and gratifying to learn that the hall provides opportunity for numerous social, educational and business functions, for which facilities are entirely lacking in many communities. It is not to be wondered at that there is a lack of community and co-operative spirit in localities where there is no building large enough to accommodate any kind of representative meeting, except the various churches, which rightly are reserved for their special purposes.

Dr. Cumming was emphatic in his opinion that, whether it be viewed from a social, educational or business standpoint, no greater contribution can be made to the welfare of many communities visited than the erection of a hall of sufficient capacity for all the residents of the locality to meet together from time to time for one or all of the above purposes.

Everywhere it was apparent that leadership is a large factor in farming communities. Where there was good leadership the meetings were invariably large and reports of development and progress were inspiring. Sometimes leadership is supplied by the church, sometimes by the farmers themselves. Whatever the source, it was evident that even with no greater natural advantages, a community that is being well led is making progress much in advance of those which lack in this respect.

SASKATCHEWAN BETTER FARMING TRAINS, 1922

FROM every point of view the Saskatchewan Better Farming Train of 1922 was an unqualified success. The attendance was large throughout the tour and a keen interest was taken in the exhibits and lectures.

Much interest was taken in an exhibit of soil samples in the Field Husbandry car, showing the effect of continuous cropping in exhausting the humus and fibre content, and also the same soil with fibre restored by the

growing of alfalfa, brome, or sweet clover, a valuable demonstration of the proper way in which to combat soil drifting. The live stock lectures dealt with the importance of using good sires for every kind of stock. The dairy lectures emphasized the importance of cow-testing. The other departments dealt with Poultry, Farm Engineering and Mechanics, Household Science, School Hygiene, Boys' and Girls' work, Tree Planting and other subjects. Many instructive exhibits were provided in the various cars comprising the train.

Better Bull Train

Seventeen thousand persons attended the meetings of the Better Bull train. This attendance far exceeded that of last year when the first train of this kind in Western Canada, and probably on the American continent, was operated. It was run under the joint auspices of the Department of Agriculture and of the Canadian Pacific Railway, which furnished and operated the train entirely free of charge. Sixty stops were made during the tour.

The train ran over the C.P.R. lines northwest from Moose Jaw to Kerrobert and Macklin, returning by way of Saskatoon to Regina. The Agricultural Societies of the districts visited did the advertising and gave much assistance; the University sent a car of pure bred cattle, chiefly females; the Moose Jaw Live Stock Exchange sent an exhibit of butcher steers to illustrate the market classification, and of hogs to show the new grading which will soon be in effect. The Cattle Breeders' Association had a representative on the train throughout the trip who assisted in sales and in lecturing.

The objects of the train were to emphasize the necessity of diversified farming, and to improve the various kinds of live stock by better breeding, better feeding and better marketing. The necessity of better breeding was illustrated by an exhibit showing how successive generations can be improved by good pure bred sires. The growing of forage crops was taken up. Lectures were given to boys and girls on breeds and types of farm animals, and moving pictures were employed.

From three to five cars of pure bred stock were carried for sale under *The Live Stock Purchase and Sale Act.* In all 62 head of pure bred bulls were sold, including representatives of all the popular breeds both for dairying and beef purposes. Thirty-nine bulls were taken in exchange, and of these, nineteen were sent to the Central Stock Yards and sold at butcher prices. The train also assisted in getting farmers together to exchange aged bulls, thus avoiding unnecessary outlay in purchasing new ones.

SHORT COURSES AND BOYS' CAMPS, SASKATCHEWAN

BY J. G. RAYNER, DIRECTOR EXTENSION DEPARTMENT, UNIVERSITY OF SASKATCHEWAN

THAT there is a strong and earnest desire throughout the province to discuss better methods of farming is clearly evidenced by the very large number of applications for short courses and lectures in agriculture received last winter by the Extension department of the Agricultural College at Saskatoon.

The Extension department conducted ninety-nine short courses in agriculture throughout the whole province, during the months of December, January, February, and March. Each of these courses was of one, two, or three days duration. As a rule, two lectures for farmers were given during the afternoon of each day,

and a general public lecture was given in the evening. Occasionally lectures were also given in the forenoon, but as a rule, the morning lectures were not so successful. At the evening lectures, either educational films were shown by means of a portable motion picture machine which the lecturers carried with them, or lantern slides were thrown on the screen to better emphasize what the speaker was discussing. Some of these courses were conducted at quite a distance from the railway, in one case 45 miles and in another 38 miles. Under these circumstances, storage batteries were taken out to the meeting places, and in this way a good safe light was available, making it possible to operate the motion picture machine.

Balanced farming, economy in production, high quality of product were some of the points emphasized. At all the courses it was made evident that western farmers must grow some forage to hold and improve the soil and keep some stock to profitably use the forage.

The lecturers were practical farmers, many of them with agricultural degrees, and all of them experts in certain branches of agriculture, such as live stock husbandry, dairying, grain and forage crops, poultry, horticulture, and forestry.

The attendance and general interest at these courses emphatically showed that many are anxious to break away from the old methods of farming, and are looking for a surer, safer, saner, more business-like system than the old method of growing wheat until the soil became exhausted or blew away.

In all, ninety-nine courses were conducted at which 257 meetings were held. The total attendance was 18,877; the average attendance at each meeting being 74. Often the capacity of the hall was the limiting factor on the number that could attend.

Farm Boys' Camps

The great interest shown in other years in the farm boys' camps held in connection with the Regina and Saskatoon Industrial Exhibitions, under the direction of the extension department of the University of Saskatchewan is leading to a considerable widening of the work. The extension department of the university, with the co-operation of the exhibition boards and assisted by the Government, inaugurated the first camps at Regina and Saskatoon in 1915. The camps have been continued since then, and have grown continually in attendance and interest. This year five farm boys' camps are being held instead of two, namely at Regina and Saskatoon, as previously and at North Battleford, Melfort and Yorkton, in addition.

In the camps this year, teams of five boys, representing the agricultural societies of their respective communities, will take part in stock-judging contests. Each team will be under the care of an adult supervisor. The camps this year will last for three days and an extensive programme of contests, athletic events and educational work will be arranged for the entrants. The Y. M. C. A. organizations in the cities and towns will manage the physical programme for the boys, which will include games and sports. The educational work, as formerly, is in charge of the officials of the University Extension department.

Farm Girls' Convention

The Sixth Annual Convention of the Farm Girls of Saskatchewan was held at the University on June 6 to 9. The programme was planned to meet both practical and cultural demands of rural life, the practical being always presented as a means to an end; all calculated more to inspire than to present a great deal of information.

Much attention was paid to nutrition as the great essential of perfect health, with physical exercise, fresh air and proper sanitary conditions as contributing factors. The provincial Bureau of Health co-operated, and the Public Health Nurse emphasized these princi-

ples and gave some practical demonstrations on the care of the sick. A trip to the University kitchen garden was a practical demonstration of the possibilities of the farm garden in providing many of the necessities for proper diet and for affording variety. On this trip the growing of trees and shrubs and the beautifying of farm surroundings was shown to be possible on the prairies. Classes in millinery and dressmaking were conducted, and swimming, physical exercises and folk-dancing occupied the evenings. The delegates report the proceedings to the organizations they represent.

ALBERTA PURCHASES FINE BULL

WHAT is stated to be one of the finest young Holstein-Friesian bulls on the American continent, has been purchased by the Alberta Department of Agriculture, for the Holstein herd at Stony Plain demonstration farm, which will later be moved to the government farm at Halfway House, near Edmonton. This bull, Sir Sylvia Car Born, aged a year and a half, was purchased from the herd of Senator A. C. Hardy, of Brockville, Ontario, and is the product of a long line of noted ancestors which have held world's records for milk and butter production.

The dam of Sir Sylvia is Pietje Car Born Dekol, No. 330771, and has a record of 38·77 pounds butter and 760·9 pounds of milk in seven days, and 6,201 pounds milk and 304·79 pounds butter in 60 days. The sire is Champion Echo Sylvia Pontiac No. 154779, known today as one of the outstanding breeding bulls on the continent. He has already 27 A.R.O. daughters, including Lady Waldorf Sylvia, with a record of 34·45 pounds butter in 7 days, and in 305 days of 19,945 pounds milk and 903·14 pounds butter, as two year old. Another two-year old daughter, Echo Sylvia Bell, produced 31·14 pounds butter in 7 days, and another, Sylvia Pauline Echo, produced 30 pounds butter in 7 days. The dam of Champion Echo Sylvia Pontiac is the celebrated May Echo Sylvia which holds the world's records in butter and milk production for 7, 30, 60, and 100 days. Her record for 7 days is 1,005 pounds milk and 41 pounds butter; for 30 days it is 3,767·30 pounds milk and 169·72 pounds butter; for 60 days it is 7,927·10 pounds of milk and 323·32 pounds butter; for 100 days it is 12,899·80 pounds of milk and 505·34 pounds butter. The sire of Champion Echo Sylvia Pontiac, or the grand-sire of the new Alberta bull, is Spring Farm Pontiac Cornucopia No. 77172. His dam, K.P. Pontiac Lass, had a record of 44·18 pounds butter in 7 days. The half-brother of Champion Echo Sylvia Pontiac, the sire of the new bull, was purchased some years ago by the Carnation Milk Company for $106,000.

PART III

Agricultural Education and Related Activities

TREE PLANTING ON PRAIRIE SCHOOL GROUNDS

BY NORMAN M. ROSS, CHIEF OF TREE PLANTING DIVISION, DEPARTMENT OF THE INTERIOR, INDIAN HEAD, SASK.

THE casual observer travelling over the prairie provinces, when approaching the average rural school, is almost invariably impressed by the bareness and generally uninviting appearance of the buildings and the surrounding grounds.

Though there are exceptions, the school building itself usually lacks any distinctive features of construction. A cheap shed or stable, placed fifty or perhaps a hundred yards behind the schoolhouse, and a couple of outbuildings, usually a very prominent feature of the landscape, placed on an area comprising from a half to two acres of bare level land, sometimes surrounding by a fence, not always in a very good state of repair, would be a fitting description of at least 60, perhaps 80 per cent of the rural prairie schools. Hardly an environment to inspire the young mind with high ideals or assist in the development of a sense of beauty.

In a new country, where the settlers are struggling generally to become established, and with but little money available for purposes other than actual necessities, one cannot expect to find conditions very much different to what they are. In all the prairie provinces, however, there are large districts which have been settled for a number of years where the farmers are well established and comparatively well-to-do, with good houses and farm buildings. In such districts one would naturally look for improvement in the general appearance of the rural school in keeping with the development of the neighbourhood. In many cases in these older districts, new schoolhouses of a more pretentious character have been built, but, generally speaking, there is seldom any attempt made to beautify the surroundings. In some cases there are evidences that a few trees had been planted, but have since been neglected, and remain only as stunted or dying bushes, detracting from rather than adding to the general appearance.

It must be admitted that it is most desirable from every standpoint that more attention should be given to making the rural prairie school surroundings more attractive, especially in such districts where there is absolutely no natural tree or shrub growth. There are, here and there, exceptions to the general rule, where one finds a thrifty, well cared for shelterbelt, perhaps supplemented by groups of shrubs, a neatly kept hedge and flower beds. If inquiry be made in regard to such successful plantings, it will almost invariably be found that either a neighbouring farmer, who possibly may have been a trustee for a number of years, has personally looked after the planting and actual upkeep of the grounds, or that the same teacher has had charge of the school for several seasons, and, having a particular aptitude for and some knowledge of tree culture, has through his individual efforts, both by personal labour and by keeping the matter before his trustees, succeeded in getting the grounds planted and kept in an attractive condition.

In dealing with this question, it must be realized that in order to grow trees and shrubs successfully under prairie conditions, the ground must first be carefully prepared at least a year in advance of planting. After planting, especially in the case of narrow belts and small groups, continual subsequent cultivation is essential, otherwise grass and weeds will soon work in among the trees, robbing them of moisture, and in a very short time the trees will die out. To be effective all work of this nature must be done at the proper time, which is usually just when farmers are especially busy getting in their crops, and it is always a difficult matter to find local farmers who are willing to leave their own work during the busy seasons to plant and cultivate a few trees on the school grounds. We understand that trustees themselves are not permitted to receive remuneration for any work they may do with their own labour and teams on the school grounds, and it is often very difficult to secure other labour in the immediate neighbourhood. The chief handicap, however, is due to the fact that the personnel of the school boards is changed almost annually and no single person has any sustained interest or authority. In the developing of tree planting, this is a very important point, as no successful results can be expected without more or less continuity of plan, and supervision exercised by one or perhaps two individuals.

As a general rule the area of ground surrounding the rural schools is too small to permit of much planting, and at the same time, leave a sufficient area for playgrounds, stable room, etc., and when the buildings are first placed on the property no thought, apparently, is given to the subsequent laying out and beautifying of the grounds.

Typical of the bare and unattractive surroundings of the average rural school on the Prairies.

The Tree Planting division of the Forestry Branch has always been anxious to assist in the planting of these rural school grounds, and a very considerable amount of material has been supplied for that purpose, but the results have been anything but encouraging.

In Alberta, we have supplied trees to 97 schools; 31 of which are comparatively recent applicants of the 66 older plantings, reports obtained from our inspec-

tors show only 20 per cent good, 20 per cent fair, and 60 failure, weedy and neglected. About 80,000 seedlings have been supplied to these 97 schools.

In Saskatchewan, we have on our lists 676 schools, of which 486 have received trees and 144 are new applicants this season. Of 123 school plantations inspected last summer 53 per cent were well cared for, 27 per cent fair and 20 per cent neglected. The officials of the Department of Education in Saskatchewan seem to be giving this matter far more attention than is shown in either Alberta or Manitoba, which accounts for the very much larger number of applications from that province. A few years ago, the Provincial Department of Education undertook to encourage school planting, and arranged for a special inspection of all school grounds before recommending any applications to our office. The inspection and applications are handled through the office of the Director of School Agriculture. While the results under this system are very much better than when the Forestry Branch treated with each school independently, there is still room for very much improvement. Conditions, however, cannot very well be remedied unless more money can be made available for the actual financing of the planting operations and the subsequent upkeep of the tree belts.

In Manitoba, only 31 schools have been supplied with trees, and at present only 6 schools are on our inspection list.

The problem of successfully planting the grounds of the prairie schools is not an easy one to solve. It is a line of work that should receive every possible encouragement, but success depends entirely on a proper organization to handle the work, more or less continuity of supervision, and sufficient funds to properly finance each individual operation.

THE PRINCE EDWARD ISLAND AGRICULTURAL AND TECHNICAL SCHOOL

BY VERNON CROCKETT, PRINCIPAL

THE second year of the Prince Edward Island Agricultural and Technical School, Charlottetown, which concluded in the spring of 1922, was a most successful one. The enrolment was double that of the year previous and the attendance was very regular.

A number of changes had been made in our courses of study, and the work was carried on in three separate divisions—a matriculation course for students who intend to take four years at one of our agricultural colleges; a full agricultural course for students who intend to follow farming as a calling, and a motor mechanics course for students who wish to specialize in that department. The subjects taken in the matriculation course are English, French, and History, Mathematics and Chemistry; in the agricultural branch, Live Stock, Field Crops, Poultry and Dairying, Motor Mechanics, Carpentry, Blacksmithing, English, Arithmetic, Civics, Economics, and General Science. The subjects taken in the Motor Mechanics course are Motor Mechanics, Blacksmithing, Wood-working, English, and Arithmetic.

Our students come from every section of the province. In individual attainments they vary considerably. This variation is due to difference in age, difference in aptitude, difference in early training. To bring together half a hundred young men of such unequal attainments, and to subject them to such a course of training as will enable them to develop their latent energies, and dis-

cover their latent possibilities is no easy matter. Our success is due to a variety of causes, but particularly to the students themselves. They applied themselves zealously and enthusiastically, and the amount of theoretical and practical work they have been able to cover in the short period of five months is indeed remarkable. Patient instructors, pleasant surroundings, up-to-date equipment and facilities did the rest.

The certificates awarded in the various courses were as follows:—

Matriculation Course. 3

Agricultural Course
- First-Class Certificates. 10
- Second-Class Certificates. 7
- Third-Class Certificates. 3

Motor Mechanics
- First-Class Standing. 10
- Second-Class Standing. 3

In making awards, class work counts 20 per cent, practical work 40 per cent, and written examinations 40 per cent.

A word about the different subjects on our course would not be out of place. The work in our main subjects, Live Stock and Field Crops, has been considerably extended this year. Besides the regular lectures and class room demonstrations, experiments of a very valuable kind were carried on with the dairy herd at the school dairy barn. Problems in feeding, care and management, and the keeping of records were taken up in a very practical manner and excellent results were achieved.

The dairy industry is fundamental in the development of our province. The importance of this industry cannot be over-estimated, and this is the reason why an up-to-date, fully equipped cheese and butter plant is being operated at the school. The new word in the dairy industry is standardization. The world's markets are demanding milk products of standard quality, and we must either produce the goods or go out of business so far as the open markets are concerned. This makes cheese and butter manufacturing a business for experts. To get standard products on the markets every part of the manufacturing process must be watched with the closest attention. That is why we try to give our students an insight into every phase of the business—from the production of the raw material to the consumption of the finished products, because eventually, if we wish to reap the full benefit to be derived from the dairy industry, all this work of production and manufacturing and marketing must be done co-operatively; and these students of ours will be active members in these co-operative societies. This is the way they did it in Denmark, and Denmark attributes her outstanding position in the dairy world to the organization and successful operation of her agricultural high schools.

Another department in which we take considerable pride is Motor Mechanics and Blacksmithing. The application of motor power—the car, the tractor, the gas engine—to farm operations has rendered some form of technical instruction imperative. This school through its motor mechanics department is able to meet this demand.

The amount of motor equipment destroyed every year in this province through lack of knowledge of the mechanical and technical principles involved would more than meet the whole of the expenses of operation of this vocational school.

This year notable advances have been made in the farm carpentry department. Particular attention is given to the use and care of tools. Building construction, the use of concrete, the making of models and useful articles of furniture are among the problems that have engaged the attention of our wood-working students.

Just here I want to say something about our physical training, as both these departments are in charge of the same instructor. So important do we consider physical training in any scheme of all-round development that we make

it an essential part of our daily programme. At this time when there is a tendency to throw off all restraint and to chafe under restrictions the disciplinary value of physical training in connection with all our educational work cannot be too strongly emphasized.

Space forbids my referring to the other subjects on the course: English, Arithmetic, Civics, Economics, and General Science. Here we attempt to bridge the gap between the general work of the elementary school and the work of the vocational school proper. In English special emphasis is placed upon reading, writing, oral and written composition. Our object is to develop freedom in the use of language and to foster a love for good wholesome literature. We find our literary and debating society a valuable aid in this direction. Through our civics department we aim at giving useful training in good citizenship.

As regards economics: the successful farmer is a student of economics whether he knows it or not. More attention is being given to this subject than ever before in the world's history. Practically all the ills of the world are due to economic causes, and it seems to me that an intelligent appreciation of the economic laws governing the production, distribution and consumption of wealth would put an end to much of the unrest, the bitterness and the foolishness which characterizes our handling of economic problems at the present time. I should like to see a practical course in economics taught in every educational institution in the country.

The outline of courses for next year is as follows:—

(*a*) A matriculation course for students who wish to take the four years at one of our agricultural colleges.

(*b*) An advanced course in agriculture for students who have taken the first year course, or for students whose scholarship would enable them to profit by the instruction given.

(*c*) An elementary course in agriculture for all students over fifteen years of age.

(*d*) A motor mechanics course for students who wish to specialize in this subject.

(*e*) A course for lobster packers and factory operatives.

(*f*) A course in household science for girls.

(*g*) Night classes for city students.

(*h*) Short courses (two weeks) in live stock, field crops, motor mechanics, cheese and butter making.

(*i*) Course for cheese and butter factory operatives.

A HIGH SCHOOL POULTRY PROJECT

BY JEAN THOMPSON, HIGH SCHOOL, CHILLIWACK, B.C.

In the issue of *The Agricultural Gazette* of March-April, 1921, there appeared an article by Mr. J. C. Ready, District Supervisor of Agricultural Instruction at Chilliwack, B.C., outlining a number of projects in agriculture then being undertaken at the Chilliwack High School for the first time. Criticisms, favourable and unfavourable, were presented in the succeeding issue. The report of one of the students who undertook the poultry project is given below, and will be read with interest in this connection.—*Editor.*

ON the first of January, 1921, the writer was attending Chilliwack High School and undertook to keep the cost records of the home flock of poultry during the year as a home project in connection with the agricultural course which forms part of the regular High School work. The distance from home to High School was so great that it was necessary for the writer to

remain in town four nights of each week. Arrangements therefore were made with the person who had charge of the poultry to keep the data during periods of absence.

The Flock.—The flock consisted of two pure breeds, two White Wyandottes and thirty-eight Buff Orpingtons.

The Equipment.—The main building is 10 by 24 feet with three smaller pens in connection to be used for breeding, incubation and rearing purposes. The buildings have a southern exposure and are well protected from the north eastern winds by a bank. The buildings are of the shed roof type, are constructed with one ply of ship-lap, and have a strip of cotton over an open front for ventilation. All the buildings are built on skids so that they may be moved if desired. There is a run of approximately 2,000 square feet in which the birds were confined for a short period in the spring while the crops and garden were getting a start. For the rest of the year they had free access to the orchard. Here the trees afforded them shade during the hot summer days. In bulletin No. 89 by F. C. Elford, Dominion Poultry Husbandman, this appears to be a generally approved method of providing health-giving exercise for the birds. No changes were made in the equipment, housing, yard or runs during the year that would affect the results.

Incubation.—Natural incubation was the method used. The heavy breeds of poultry such as the Buff Orpingtons make patient and persevering sitters and excellent mothers. For the nests, boxes of fair size were used. In the bottom of each a large sod covering the entire bottom to a depth of several inches was placed and a hollow made for the nest. Fifteen eggs were allowed to each hen. These eggs were carefully selected as regards shape and size. The nests were placed in a pen where the sitters would not be disturbed by other hens.

About 150 chickens in all were hatched and for this small number the system of natural incubation seems to be the best to follow according to the bulletin referred to above.

During the year, a setting of eleven duck eggs was received without charge, from which eight ducks were hatched and six were raised. A setting of five goose eggs was also received from which four goslings were hatched and two raised.

Care of the Chicks.—About twenty-four hours after hatching, the young chicks were placed in a coop with their mother and given bread and milk for two feeds. The first of these was given when the chicks were about one day old, followed by the second in perhaps four hours. For about a week following, they were fed entirely on prepared chick food. Then a wet mash consisting of shorts and milk was introduced into their diet and given them at noon. When about six weeks old they were allowed the same rations as the hens. There was always sour milk and green feed before them.

Subsequent Care.—The chickens were allowed to run for two and a half or three months. At this age the cockerels were picked out and confined in a pen for a week or ten days prior to selling as broilers. The poorer looking pullets were also classed with the broilers. The remaining pullets were marked with leg bands later in the summer in order that they might be distinguished from the old hens.

The percentage of sex was just about equal. There was practically no mortality.

The costs were distributed as follows:—

Housing, including runs, depreciation, interest and repair, 12.4 per cent; labour, 21.1 per cent; feed, 66.5 per cent.

Of the receipts, the eggs produced constituted 49 per cent of the total, and the surplus stock sold constituted 51 per cent of the total.

The following figures summarize the season's work.

POULTRY ACCOUNT, 1921-22

Receipts

Inventory January 1, 1922—			
Buildings and yard	$67 00		
5 Roosters—4 at $2.50—1 at $1.50	11 50		
50 Hens	75 00		
		$153 50	
Amount received for eggs, January 1 to June 1	$66 30		
Amount received for eggs, June 1 to September 1	30 87		
Amount received for eggs, September 1 to January 1	20 79		
May 27, amount received for broilers	4 20		
June 3, amount received for old hens	17 27		
July 17, amount received for broilers	8 05		
August 20, amount received for broilers	21 60		
September 4, amount received for broilers	2 00		
September 15, amount received for broilers	22 44		
September 19, amount received for broilers	22 50		
September 19, amount received for old hens	11 34		
December 20, amount received for geese	7 50		
December 22, amount received for ducks	6 00		
December 27, amount received for broilers	1 50		
		$242 36	
			$395 86

Expenditure

Inventory June 1, 1921—			
Buildings and yard	$75 00		
2 Roosters	10 00		
38 Hens	76 00		
		$161 00	
Grains, from January 1 to June 1	$49 87		
Grains, from June 1 to September 1	40 97		
Grains, from September 1 to January 1	24 70		
Milk, from January 1 to June 1	5 00		
Milk, from June 1 to September 1	3 00		
Oyster shell	1 25		
New Cotton, 7 yards at 25 cents	1 75		
Time 99 hours at 40 cents	39 60		
10 per cent depreciation on equipment, yard and building	7 50		
Interest on Buildings, etc., at 6 per cent	4 50		
Interest on Average Inventory for year at 6 per cent	9 43		
		$187 57	
			$348 57
Net profit			$ 47 29

PROGRESS OF ELEMENTARY AGRICULTURAL EDUCATION IN SASKATCHEWAN

BY F. W. BATES, B A., M Sc., DIRECTOR SCHOOL AGRICULTURE

THE school exhibition is now an established institution in the province of Saskatchewan and further development will be along lines of better organization and more efficient correlation with the regular school routine, rather than in an increase of numbers. The Rural Education Association, having proven its worth, is adopting itself to the growing needs of the time. Boys' and Girls' Clubs are now recognized as worthy supplements to the school and the whole problem of agricultural instruction is receiving sane and careful attention. The stage of experimentation and more or less vague effort has passed. The period of sifting the best from the work of previous years and adapting it to true educational ideals has been entered upon.

School exhibitions reached their present development and importance in the province in a comparatively short time. In 1909, one school exhibition, the first

of its kind, was held, and in 1921 the number of exhibitions had grown to 280. In that year 1,825 schools or well over one-third of the schools in the province, took part in exhibitions, and 42,100 pupils exhibited. The percentage of enrolled pupils exhibiting, given as 69·5 was also very high. The development of special contests in singing, public speaking and play has been noteworthy, and in many cases these have overshadowed the usual lines of school exhibits. The organization of the agricultural work under Boys' and Girls' Club rules is becoming more common, and is resulting in the elimination of many of the weaknesses of the past.

During the year 1921, 37 new rural education associations were formed, bringing the total number in the province up to 186.

The Boys' and Girls' Clubs were placed under the direction of the branch a year ago. Following up the system instituted in 1920, clubs continued to be organized as activities of Rural Education Associations, and in most cases are conducted under these auspices. There were, during 1921, 64 clubs with 247 branches, and a membership of 2,013 boys and 1,852 girls. The records show that more than twice as many centres took up club activities in 1921 as in the previous year, the number of branches increased in proportion, and there were almost four times as many members. The activities of the clubs consist of calf, pig, sheep, colt, and poultry rearing, potato growing, gardening, canning, stock judging and some other activities not specially provided for in the provincial club programme, such as manual training, sewing and baking.

Tree planting of school grounds is another matter coming under the supervision of the branch. Only in those districts where the ground is carefully prepared and the other regulations met, is this activity permitted. A total of 65 districts met the requirements in the spring of 1922 and were allotted a supply of seedling trees for planting. The plantations made in former years are on the whole doing well, and in a number of instances poor plantations are showing improvement.

RURAL SCIENCE SCHOOL, TRURO, N.S.

THE Director of Rural Science for Nova Scotia, Mr. L. A. DeWolfe, reports that the Rural Science Summer School for Teachers opened in Truro, N.S., July 12, with 203 in attendance. Of this number 33 are young men.

Many are attending for the first time, but several are enrolled for the third or fourth time. The usual enthusiasm prevails, and a great variety of activities keeps every one interested and occupied.

Besides the regular scientific and agricultural subjects, considerable attention is given to "extra-curricular" subjects. The Community Centre idea is well exemplified in the school recreation room. Public speaking, debating, athletics, playground methods, music, and basketry occupy the hours not devoted to scientific subjects. The daily programme is from 7 a.m. to 10 p.m. Having something to do every hour does more to create a good school spirit than any one might at first suspect. Working together and playing together fosters the community spirit, which the country so much needs.

HOUSEHOLD SCIENCE DEGREE COURSE, ONTARIO

THE University of Toronto announces the provision of a course in Household Science leading to the degree, Bachelor of Household Science. The course is designed primarily for persons actually engaged in teaching.

The first two years of the course are to be taken under the direction of the department of University Extension. This department provides classes in certain subjects at hours convenient for teachers and during the summer session in July and August. Students are required to have the ordinary teaching certificates and to qualify in all the subjects necessary for the first two years of the Arts course. The last two years must be taken in regular attendance at the University. Information regarding the course may be obtained on application to the Director of University Extension, University of Toronto.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

VETERINARY SANITARY SCIENCE

A Brief Historical Sketch of the Early History of Live Stock Quarantine in Canada

BY DUNCAN McEACHRAN, LL.D., F.R.C.V.S., V.S., EDINBURGH, D.V.S. McGILL, EMERITUS DEAN AND PROFESSOR, FACULTY OF COMPARATIVE MEDICINE, McGILL UNIVERSITY, MONTREAL

HAVING been asked to present a short résumé of Veterinary Sanitary Science in Canada, it is necessary for me to revert to a time when the majority of those now most active in advancing the interests of the veterinary profession were either unborn or scarcely out of their swaddling clothes. To look back, the road appears very thorny, but, as youth looks forward with optimism, the good to be accomplished was ever ahead as a goal, the ideals were high, and in spite of the buffetings, it is now possible to look with satisfaction upon efficient systems which now protect this continent against the introduction of animal plagues from without, while they combat those within its confines.

As a young man just graduated from the celebrated school of veterinary science, the Edinburgh Veterinary College, upon request, I sought a new country for the practice of what art and science had been absorbed during the pursuit of the prescribed studies.

British America at the time of my arrival in 1862 was a new country divided into what were then known as Upper and Lower Canada. These distinctions, however, have in a large measure lost their significance. With the passing of time, the great development of what were then known as the Northwest Territories has presented other problems. Within those territories five great provinces have been developed, and there is still a sufficient area for greater expansion in the future.

Approaching the shores of the continent in the fall of 1862, I beheld with anticipation what was to become my adopted country and in which I was destined to co-operate in pioneer work connected with veterinary education and sanitation. Shortly after my arrival I was associated with the late Professor Andrew Smith and assisted him in the commencement of the Ontario Veterinary College in Toronto, Ontario. At the suggestion of the late Mr. John Shedden, I removed to Montreal, where, through his influence and that of the Grand Trunk Railway, I soon developed a comfortable practice. This was in 1866. Through the kindness of the late Dr. George Campbell, Dean of the Medical College of McGill University, and the medical staff of that Faculty, and the late Mayor Campbell of St. Hilaire, President of the Board of Agriculture, the Montreal Veterinary College was established. A small grant of $800 was voted by the Quebec Government, which when I built the Union

avenue structure was increased to $1,800—leaving the balance of expenses to be paid out of my income from practice; but no financial assistance was given, and had it not been for the liberality of the teaching staff of the Medical College, it could not have succeeded. This school later became affiliated with McGill University as its Faculty of Comparative Medicine and Veterinary Science. The success of the efforts then put forth to raise the standards and standing of veterinarians is manifested, not by financial gain, but through the appreciation of my endeavours by the young men who have attended that institution, as evidenced by the remarkable dinner given by 63 of my former pupils, representing both Canada and the United States, many coming over 3,000 miles to take part in McGill University's great centennial gathering, but especially to do honour to the Faculty of Comparative Medicine, and the Dean in particular.

Education is the basis of all true progress; therefore, as a greater amount of knowledge became available, it was found possible and economical to prevent communicable diseases among animals. The epizootic of 1872—influenza in horses—created alarm, and its reappearance in 1875 caused a further feeling of unrest lest some more serious malady should present itself. This feeling of unrest was doubtless indirectly due to the greater appreciation by the laity in general of the fact that many epizootic diseases could be prevented; consequently, it was but natural that they should look for some relief. Transportation was becoming a simpler problem, and the avenues through which infection could spread were becoming more numerous as a result of improved mechanical devices on steamships, thus increasing the speed and safety attending the conveyance of live stock from one point to another.

About this time Foot-and-Mouth disease, Rinderpest, and contagious Pleuro-pneumonia, were common in Europe and Australia, outbreaks of one or other causing much loss and serious disturbance in meat supply and, in many cases, ruin of the live stock breeders and owners. Knowing that it was only a matter of a short time till Canada would suffer in the same manner through imported live stock, a business rapidly assuming large proportions, I put myself in communication with three of the most prominent breeders and importers of pure bred cattle, sheep and swine—the late Hon. George Brown, Bow Park Farm, Senator M. H. Cochrane, Hillhurst Farm, Compton, and Senator David Christy, President, Board of Agriculture of Ontario. These gentlemen at once recognized the necessity for immediate steps being taken, and we met in Ottawa, and together interviewed the Minister and Deputy Minister of Agriculture. We were soon aware that neither appreciated the warning thus given. We then arranged for a meeting with the Premier, Hon. Alexander McKenzie, who on reading over a condensed statement of losses entailed by every country who took no precautions against the introduction of these ruinous plagues, said, "Gentlemen since I have been in politics this is the most important matter that has come before me for consideration." He immediately asked me if I would undertake for the Government to outline the necessary restrictions and, when considered and approved, would organize a system, suggest regulations, and assume the administration of necessary Orders-in-Council.

It was in 1875 that I was asked to outline what I considered the necessary restrictions to prevent the introduction into Canada of communicable diseases among animals. These are included in the following letter addressed by me to the Minister of Agriculture:—

"Montreal, 28th Sept., 1875.

"SIR,—

"The consideration of contagious and infectious diseases with a view to preventing their introduction into this country is a subject to which my attention

has long been directed as I had considerable experience with them in Britain before coming to this country. During my recent visit to Europe, I visited several farms to familiarize myself with Foot-and-Mouth disease, and from numerous conferences, with professional men on the subject I gathered what practical information I could relative to and the best means of dealing with them.

"By the careful study of the works of Flemming, Gamgee and others, I hope I have prepared myself to be of some service to the Department in taking the proper measures in endeavouring to preserve our valuable herds and farm stock free from contagious disease of a preventable character.

"It is a well established fact, that Cattle Plague, Pleuro-pneumonia, Foot-and-Mouth disease, Smallpox in Sheep, were all introduced into Great Britain by stock imported from infected districts on the continent of Europe, that they spread entirely in the lines of commercial communication, and that they are propagated by contagion and by contagion alone.

"For want of proper preventive measures these diseases have from time to time been introduced and spread over the British Isles bringing death, or almost equally ruinous deterioration in value of the entire stock, as for the time being to paralyze the agricultural industries of the country, create dearth and destitution among the labouring classes.

"The annual loss to the mother country is counted by millions of pounds sterling.

"Our country is essentially agricultural, the livestock interests represent a very large proportion of our wealth. So far we have enjoyed almost perfect immunity from such diseases. This fact alone has directed the attention of other countries to Canada as a rich source of meat supply, and this industry properly preserved and judiciously encouraged will doubtless soon become a rich source of revenue.

"That active steps are necessary need not be doubted when we know for a fact that, owing to the unusual prevalence of such diseases in England, it is almost impossible for animals to be shipped from an uninfected district; and that it is quite possible that an animal on being shipped will present no symptoms by which the disease could be recognized. The stage of incubation (period elapsing from the introduction of the disease germ till the development of symptoms) in Foot-and-Mouth disease varies from twenty-four hours to 12 days; Cattle Plague, usually 5 to 6 days, but by many it is said to extend to 16 or 18 days; Pleuro-pneumonia from 30 days to 10 or 16 weeks; and further that it is a fact that hay, straw, blankets, halters, clothing of attendants, etc., may be the medium of conveying and propagating the contagion—except in the case of Contagious Pleuro-pneumonia—the presence of which in these articles no inspection or examination can determine till the effects declare the fact.

"That the effect of a visitation of the least virulent of the above diseases to a herd by death, loss of flesh and injury to constitution, cessation of the secretion of milk, abortion, want of conception, etc., reduces its value from forty to sixty per cent.

"That these diseases with proper precautions are preventable, I have every reason to believe. The length of time elapsing from the time of shipment to their landing in the country, with the tendency for seasickness to hasten the incubation stage, are all favourable to an early development of the symptoms and recognition of the disease after landing, and thereby enable us to shorten the duration of quarantine. Our cold clear climate during winter and our dry atmosphere during summer, in my opinion, would make such diseases more controllable than in the humid heavy atmosphere of Britain. But on the other hand we know from our experience of epizootics among horses, that once the disease is propagated these very circumstances favour their spreading in a most extraordinary degree.

"I have taken the views of our most extensive importers and find that a system of quarantine would meet the approval of all of them.

"Should the Department desire it, I shall be happy to lay before them, either by letter or interview, some suggestions as to how this could be carried out without disturbing the cattle trade of the country, but on the other hand securing it by preserving a clean bill of health to our valuable herds, believing as I do with Professor Gamgee, '*that it is of the highest importance to protect the property of our people, to prevent our improvident waste of life and money, and submit a choice of evils to some interference with the freedom of the subject wherever the doings of one man or a few are likely to injure the million*'—an interference which would be approved of most by those whom it would most affect.

"Doubtless the carrying out of a thorough system of inspection, quarantine and disinfection, would occupy time and cost money but the advantages to the country would be very great.

"The above is respectfully submitted by

Your obedient servant,
(Sgd.) D. McEACHRAN.

"To the Honourable the
Minister of Agriculture,
Ottawa."

In looking over the memorandum then prepared, I cannot observe that it could have been greatly improved in the light of the knowledge then available. The outline was favourably considered, although certain difficulties beset the path and rendered its immediate adoption impracticable as instanced by the following communication received from the Department of Agriculture:

"DEPARTMENT OF AGRICULTURE,
"Ottawa, 1st October, 1875.

"SIR,—

"I am directed to acknowledge with thanks, the receipt of your communication of the 28th ultimo and to reply thereto.

"The importance of your communication is as great as are the difficulties of dealing with so embarrassing a subject. There is perhaps danger in not adopting some measure against the eventual introduction of the epizootics spoken of in your letter, and there is a danger on another kind in the creation of alarm both in this country and abroad, by the adoption of public and stringent measures in the mere provision of the possible introduction of these diseases. It has been thought advisable to take a middle course between establishing a strictly legal quarantine, and adopting no measures at all.

"I am, therefore, instructed to ask you, if you would be willing to accept a confidential mission, which would have to be executed as secretly as possible in order not to create alarm in our internal and foreign commercial relations. This mission would consist in quietly proceeding to Quebec to see, with the private and voluntary permission of the owners of vessels, the imported stock that might be on board such vessels, on their arrival at that port, and in case of no disease, to say nothing to anyone; but in case of contagious disease being in existence among such cattle, then to impress on the owner thereof, or his representative there present, the necessity of keeping for some time apart such animals under proper measures of separation and treatment under your immediate direction; the whole without cost to the owner, you defraying the necessary and legitimate expenditure on behalf of the Government.

"This mission is essentially a mission of persuasion and amicable arrangement between you, the shipowners and proprietors of cattle, for the simple reason that in the absence of an Order-in-Council and Proclamation, you cannot be invested with stringent authority. It is to avoid the publicity exacted by the Act 32, 33 Vic. cap. 37, relating to contagious diseases of animals that the present course is thought the most advisable.

"Be kind enough to answer me by return of mail mentioning your acceptance and conditions, in order that no delay intervene in the adoption of the above mentioned measures."

"I have the honour to be, sir,
Your obedient servant,
(Sgd.) J. C. TACHE,
Deputy Minister of Agriculture.

"Dr. D. McEACHRAN,
Veterinary College,
Montreal."

That the task then allotted me was as delicate as it was confidential is instanced by the foregoing letter. The difficulties to be encountered by the adoption of such a radical policy were not then wholly unforeseen, however, in spite of the arduousness of the undertaking, and the following letter presents the hearty co-operation then afforded for the conduct of the allotted investigations and the satisfactory circumstances under which they were to be inaugurated.

"DEPARTMENT OF AGRICULTURE"
"Ottawa, 5th October, 1875.

"SIR,—

"In answer to your letter of yesterday's date, accepting the confidential mission proposed to you in my last communication, I am directed to authorize you to act on the strength of the instructions thus in advance conveyed to you, and to authorize you, moreover, to employ an assistant in Quebec under your direction and responsibility

"It would be for yourself to make any arrangement necessary with the Telegraph Company, and the shipowners in the way mentioned in your letter.

"As it is impossible before hand to forsee the extent of the duties to be performed, and the amount of expenses necessitated, the Department will rely on your discretion for the settlement of all reasonable accounts.

"You may, therefore, at once enter upon the accomplishment of your mission, and be kind enough to report from time to time about the result and expenditure."

"I have the honour to be, sir,
Your obedient servant,
(Sgd.) J. C. TACHE,
Deputy Minister of Agriculture.

"D. McEachran, Esq.,
Veterinary College,
Montreal."

After the assumption of the mission as laid down, it was soon evident that further and more definite action should be taken. In the first place, from an examination of *The Contagious Disease Animals Act,* it was found to be written at a time when it was thought distance from countries in which these diseases existed was sufficient protection, and quite inoperative for the enormously increased steam communication with Britain especially, and the rapidly growing importation of live stock. I was asked to revise it, and this I did, and assisted by the Law Department at Ottawa, it was prepared, submitted to Parliament and became law. Orders in Council based on this Act were passed from time to time as necessity arose, and the regulations were rigidly enforced.

Of course, as is usual when new legislation is passed to meet new conditions, there was a good deal of faultfinding by interested parties, which, however, gradually subsided as the meaning of and necessity for the regulations were understood. In this the press helped us greatly. One of the first orders was one prohibiting the importation of cattle from England on account of the existence of Foot-and-Mouth disease. A newspaper comment on this action was expressed as follows:—

"Despite the stringent terms of this prohibition Mr. Whitfield, a rich West Indian Merchant, who has an extensive farm at Rougemont, Province of Quebec, undertook to import some thirty pure bred cattle from Liverpool, trusting to the plea of improving Canadian livestock to have an exception made in his favour. To the credit of the country the prohibition was maintained, and Mr. Whitfield had to remove his cattle to Newfoundland, whence they were subsequently re-shipped to England and sold at an enormous loss."

This drew the attention of the authorities at Ottawa to a sense of their duty in this connection, and upon my advice the first quarantine station for animals on this continent was established in 1876 opposite the City of Quebec in the premises of Fort No. 3 at Levis. This animal quarantine station is almost ideal in its location and surroundings. Through it have passed many of the best animals from which the flocks and herds of North America have sprung, and importers have given a preference to the St. Lawrence route on account of the general improvement noted in stock that have undergone their period of detention at this point. Good as was our first station, the present one provides all the requisite quarantine facilities, insuring safety in approach, perfect isolation, residence for caretaker, plenty of land for the sheds and yards, and also a special landing station for receiving and despatching the animals. After the inception of the work as above recorded, little of an interesting nature transpired, save the routine connected with the organization of any new work, till 1879, when Pleuro-pneumonia appeared in the Eastern States. As a result of the existence of this disease among a cargo of cattle arriving on the steamer *Ontario* at Liverpool, an Order-in-Council was passed, January 29, 1879, prohibiting the importation or transit of animals originating within the United States, into or through Canada. The

favourable comment on this action by the Liverpool Daily Courier of January 30, 1879 (3), was as follows:—

"The Canadian Government seem to have acted in this case with great promptitude and decision, not for injury to the United States trade, but for the protection of their own interests. The information that pleuro-pneumonia had been detected in the Ontario's cargo, and the animals condemned by the Privy Council's inspectors, was known in Liverpool Tuesday evening, and was telegraphed to Ottawa at half-past six o'clock. Allowing for difference of time, the message would reach Ottawa about two o'clock in the afternoon; and the Hon. J. H. Pope, Minister of Agriculture, must have been on duty at the office at the time. He at once summoned a Cabinet Council, and within an hour or two an Order in Council was issued prohibiting the entry of cattle from the United States into the country absolutely. This is simply carrying into execution the established policy of the Canadian Government of protecting their own herds by imposing stringent regulations against the importation of cattle from countries under the taint of suspicion."

To verify the existence of the disease, I visited Maryland, the District of Columbia (assisted by Dr. Bushman), and the city of Brooklyn, N.Y., being accompanied by Drs. Gadsen and Lockhart. Professor Liautard assisted materially in the investigations then made as did also Dr. L. McLean the then veterinary inspector to the Board of Health for Brooklyn. In reading again some of the notes and newspaper clippings of that time—1879—my mind reverts to the disgusting conditions then found, which modern sanitation and adequate sanitary inspection now render impossible.

Professor Law was at this time authorized by Governor Robinson of New York State to stamp out the disease by the killing of the cattle if this was found necessary. A prominent agriculturist in the person of General Patrick of Onandaga was delegated to assist him in this work. To the credit of both, the work was well handled in spite of the many obstacles which were confronted.

That the possibility of pleuro-pneumonia appearing in the United States was not wholly overlooked is attested by the fact that the Federal Government in 1871 published an excellent work on the disease prepared for them by Professor John Gamgee. No previous effort had been made, however, to prepare for such an emergency as existed in 1879. Public opinion did not with unanimity accept the statement that the disease was pleuro-pneumonia, instancing that the same affection had been common to distillery fed dairy cattle since 1842, nevertheless the professional views were incontrovertible and prevailed, and the impetus given to the general improvement of the conditions under which animals were kept especially dairy cattle, was great. Steps were soon taken for the further safeguarding of the livestock by the various authorities concerned, and as we look back it seems more than probable that this outbreak of pleuro-pneumonia was a blessing in disguise, for it opened the way to a fuller conception of the ability of veterinary surgeons to act as sanitarians.

As early as 1880 Canada prohibited the introduction of hogs from the United States on account of the prevalence of hog cholera. This was prior to the existence of any exact knowledge concerning the cause of the disease, and what was known concerning it had been secured through the school of experience and close observation. This order was shortly modified and hogs were allowed entry when they were destined for immediate slaughter.

In August, 1882, six years after the inception of the Quarantine Station at Quebec, it was visited by the American Treasury Cattle Commission which consisted of Professor James Law of Cornell University, Dr. E. F. Thayer, of Boston, and Mr. J. H. Saunders, Editor of *The Breeder's Gazette,* Chicago. Their mission was one of inspection, as it was then considered probable that cattle quarantine stations would be established

at the ports of Boston, New York, Baltimore, and Philadelphia. Their report on the quarantine station was very complimentary.

In 1882, Texas fever threatened to invade Canada, but fortunately it did not gain access. At that time the nature of the malady was not understood, and, therefore, any measures adopted to restrict its ravages were more drastic than are considered necessary at this time when, thanks to the painstaking researches of Professor Theobard Smith, of Harvard University, and Dr. Kilborne, we are familiar with the parasite and its transmission by the cattle tick.

In February, 1884, Foot-and-Mouth disease was introduced at Portland, Maine, in cattle brought by the steamship *Ontario*. I was sent for by the Live Stock Commissioners of Maine, at the request of the owner of the cattle, and assisted the state veterinarian, Dr. Bailie, in establishing quarantine, which was removed within three months. Several hundred cases occurred, but the disease did not spread in Portland or surrounding country, thanks to the strictly administered quarantine measures.

In 1886, pleuro-pneumonia was introduced at the Quebec Quarantine Station, and it may here be mentioned that Foot-and-Mouth disease has been introduced at this station on several occasions, but, by the barrier which the station interposed, the spread of the infection outside of the restricted area has always been prevented.

During the period to which I have referred, I was not unmindful of the desirability and necessity of having a properly equipped experiment station at which evidence could be secured relative to the best means of dealing with the problems confronting us. In 1892, through the estimate and report of the late Dr. Wyatt Johnson, a new impetus was given to the project, but the requests then made were unavailing and it was not until 1898, when, with the co-operation of Drs. Adami and Martin, a small station was established on my own property at Outremont, the expenses of which were paid by the Department of Agriculture of which the late Hon. Sidney Fisher was Minister. In this connection I cannot commend too highly the hearty co-operation accorded us by the Washington authorities when problems of vital interest to the United States and Canada were involved—a friendly reciprocity, much to the benefit of both countries, which continued as long as the administration of quarantine affairs was under my direction. On more than one occasion, such as when we agreed that direct inoculation by Rutherford of Edinburgh as a preventative of contagious pleuro-pneumonia was a serious danger to both Canada and United States, which must be stopped, or importation from Britain arrested, I was commissioned to represent both countries in the matter, and succeeded in the protection from a serious menace of all three countries. England passed an order making this practice illegal under severe penalties.

The importance of the science of sanitation will continue to increase, and the basis of this importance will, in the future as in the past, rest primarily upon the educational standards of the veterinary colleges and the integrity of the men who are called upon to deal with the problems involved.

Mr. Alexander Waddell was appointed in 1876 to take charge at Quebec on the opening of the Point Lévis Cattle Quarantine. Mr. Waddell performed the duties of local inspector and manager till his death in 1879, with much satisfaction to the Department and me as Chief Inspector. He was an old Scottish graduate of the Edinburgh Veterinary College, advanced in years and experience, a man of high principles, faithful and just, whose services as a veterinary practitioner in Quebec city were universally appreciated.

Mr. Waddell was succeeded in this position by Dr. J. A. Couture, a graduate

of the Montreal Veterinary College, and for many years a valued examiner of graduates. He published a valuable monograph of the Guion system of judging dairy cattle by the escutchion. He was appointed Local Inspector and Superintendent of the Point Lévis Cattle Quarantine in 1879, and filled the position faithfully and satisfactorily till his lamented death, which occurred on March 12, 1922, after a somewhat prolonged illness.

He prepared himself by careful study of contagious diseases, and was efficient in the diagnosis and sanitary measures necessary to the effective carrying out of his duties. He at the same time did much good service in connection with the Department of Agriculture, and Horse and Cattle Breed associations in the Province of Quebec. He was an industrious worker, and was ever ready to give his assistance to any efforts tending to better the live stock interests of the Province or Dominion. He was largely instrumental in reorganization of the Cattle Quarantine Station in its present position, which is creditable alike to him and the Government. It is without doubt the most complete station of the kind to be found anywhere. His name should be in some way perpetuated in connection with the Point Lévis Cattle Quarantine.

Another officer was Mr. Wm. Welch, whose long service as foreman and manager of the Lévis Quarantine was characterized by efficiency and faithfulness. He was approved by the Department and me most highly, and the owners of cattle, both Canadian and American, were always loud in praise of his trustworthiness and obliging disposition. His long service began in 1879 and he held the position for 43 years, being superannuated in May, 1922.

I apologize for the length of this historical sketch, yet I feel that it would be incomplete were I to close without a few remarks on others who helped to build up the Cattle Quarantine system of Canada to its present high state of efficiency. Following Hon. Alexander Mackenzie in appreciating the importance of this branch of the Department of Agriculture, came Sir John A. Macdonald, who realized as much as I did the value to the country at that time of the successful prevention of introduction of contagious bovine diseases, raging in Great Britain, and more than once did he freely express his conviction that had delay or less thoroughness in administering of the preventive measures been followed that particular time, the loss to the country in live stock might have cost millions and set the progress of agriculture back at least fifty years, or double that.

Once established and the whole matter evolved in its relation to agriculture, subsequent governments realized its paramount importance and to-day no other Dominion, and few countries, have such thoroughly equipped Live Stock and Meat Inspection organizations. Much credit is due to my successor, Dr. J. G. Rutherford, and the present incumbent, Fred Torrance, B.A., D.V.S., one of my students and graduates, possessed of scientific knowledge and commendable executive ability, and a personality appreciated by all serving under him or doing business with his branch of government service.

References

(1) *New York Herald,* 1872.

(2) *Canadian Sportsman,* September 1, 1882.

(3) *Daily Courier,* Liverpool, January 30, 1879.

Montreal Gazette, February 12, 1879 —Editorial.

A METHOD OF JUDGING FOWLS FOR EGG PRODUCTION

The method of judging egg production, formulated at the Judging School held at Cornell University, Ithaca, N.Y., July 1-6, 1918, and approved by the American Association of Instructors and Investigators in Poultry Husbandry, as revised July 3-8, 1922, by Representatives of Poultry Departments, Connecticut, Indiana, Massachusetts, New Jersey, New York, Ontario, Canada, Oregon, Wisconsin, participating is given below.

In order to lay well a bird must have a sound body. As a first consideration a bird must be vigorous and healthy. Vigour and Health are shown by a bright, clear eye, a well set body, a comparatively active disposition and a good circulation.

Further, the bird must be free from Physical Defects, such as crooked beak, excessively long toe nails, eyelids that overhang so that the bird cannot see well, scaly leg or anything else that would keep the bird from seeing or getting an abundance of food.

Age, condition, feed and range should be considered in culling a flock.

Type.—The type of a bird indicates the degree of intensity with which it can lay. Type can be applied to any breed, age or sex, or condition at any time of year.

In order to make a record a hen must not only lay long, but heavily. In order to lay heavily, she must have sufficient body capacity to digest large amounts of food rapidly. Large capacity in a laying hen is shown by a body that is relatively deep. The under line should be fairly straight and the back should be compartively horizontal.

The back should be flat and wide and its width should be carried well back to the tail. The back that tapers decidedly or slopes down indicates poor capacity.

The breast should be full, deep and prominent. The neck should be fairly short and well set. The legs should be of moderate length. The long-legged, round-shanked, long-necked, bony or crow-headed individual is not a good layer.

The keel bone should be long and generally curved. This frequently means that the abdomen of a good male will be small rather than large.

The head should be moderately fine with large, bold eyes set well out on the side of the head in an oval eye socket. The head should be wide and flat at the top, and wider on top than below the jaws. A fat-headed, small, round-eyed, or cross-eyed bird or one with overhanging eyebrows, or having a comb with extremely narrow serrations is not likely to be a good layer.

Long, narrow feathers indicate a late maturing bird. Care should be taken not to confuse a bird that appears deep because of long, loose feathering, with one that has an actual bone and flesh depth.

Depth, and slabsidedness may be measured by placing the thumbs on the middle of the back, the little fingers on the front end of the keel bone and the middle fingers on the rear end of the keel bone. Press in with the palms of the hands and do not squeeze the bird up with the fingers. The deeper and more slabsided the bird feels, the better. It is relative depth that is desired and not actual depth. A big hen may be actually deep and yet relatively shallow and hence be a poor layer. Relative depth of front to rear of body may be measured by spanning the body with the thumb and middle fingers from back to breast and sliding the fingers and thumb along the keel and back.

Body changes Due to Laying.—A laying hen has a large moist vent, showing a wide, dilated condition and looseness as compared with the hard, round, puckered vent of a hen that is not laying.

The whole abdomen as well as the vent is dilated so that the pelvic arch is

widespread and the keel is forced down, away from the pelvic arch. The more eggs a bird is going to lay the following week the greater will be the size of the abdomen. The actual size of the abdomen is influenced by the length of keel, size of eggs laid and by the size of the bird. A sagging abdomen is undesirable.

Heavy production is shown by the quality of the Skin and the thickness and stiffness of the pelvic bones. Fat goes out from the skin and body with production so that the heavy producers have a soft, velvety skin that is not underlaid by layers of hard fat. The abdomen in particular is soft and pliable. The sternal processes are very prominent and are generally bent outward. The thicker and blunter the pelvic bones and the greater the amount of hard fat in the abdomen, the less the production or the longer the time since production.

Changes in Secondary Sexual Character.—The comb, wattles and earlobes enlarge or contract, depending on the ovary. If the comb, wattles and earlobes are large, full, plump and smooth, or hard and waxy, the bird is laying heavily. If the comb is limp the bird is only laying slightly, but is not laying at all when the comb is dried down, especially at molting time. If the comb is warm it is an indication that the bird is coming into production.

Loss of Fat Due to Laying.—Colour, or pigmentation changes. (These should be observed by daylight.)

A laying fowl uses up the surplus fat in the body, especially it removes the fat from the skin. In yellow skinned breeds, this loss of fat and pigment can readily be seen by the loss of the yellow colour. The different parts of the body tend to become white, according to the amount of fat stored in the body and the amount of circulation of blood through those parts. The changes occur in the following order:

The Vent changes very quickly with egg production so that white or pink vent on a yellow skinned bird generally means that the bird is laying, while a yellow vent means the bird is not laying. It should be recognized that all yellow colour changes are dependent on the feed, coarseness of the skin and size of bird. A heavy bird fed on an abundance of green feed or other material that will colour the fat deep yellow will not bleach out nearly as quickly as a smaller or paler coloured bird. A bird with lustrous shanks does not fade as quickly as a dull shanked bird.

The Eyering, that is, the inner edges of the eyelids, bleaches out a trifle slower than the vent. The ear lobes on leghorns and anconas bleach out a little slower than the eyering, so that a bleached earlobe means a little longer or greater production than a bleached vent or eyelid.

The colour goes out of the beak beginning at the base and gradually disappears until it finally leaves the front part of the upper beak. The lower beak bleaches faster than the upper, but may be used where the upper is obscured by horn or black. On the average coloured yellow-skinned bird, a bleached beak, means heavy production at least for the past four to six weeks.

Molting.—When a bird stops laying in the summer she usually starts molting. The later a hen lays in the summer or longer the period over which she lays, the greater will be her production, so that the high producer is the late layer and hence the later molter. The length of time that a hen has been molting or has stopped laying can be determined by the molting of the primary feathers. It takes about four to six weeks to completely renew the primary feathers next to the axial feathers and an additional one to two weeks for each subsequent primary to be renewed, depending on the type of the feather; very long or very wide feathers grow slowly.

Temperament and Activity.—A good layer is active, intelligent and friendly and more easily handled than a poor layer. A low producer is shy and flighty and stays on the edge of the flock and will squak when caught.

NEWS ITEMS AND NOTES

Mr. W. A. Dryden, Brooklin, Ontario, the well-known breeder of Shorthorn cattle, is visiting South America as the representative of the Dominion Department of Agriculture for the purpose of studying the market for Canadian breeding stock. While there, he will attend the Buenos Aires Live Stock Exposition with a view to ascertaining requirements, and will seek to interest importers in Canadian-bred foundation stock.

The number of dairy herds in Canada which have been fully accredited by the Veterinary Director General is now over 200 In addition to these 876 herds are in process of accreditation.

According to a statement issued by the Veterinary Director General, it has been decided, in connection with the accreditation of pure bred herds, to make ten the minimum number of animals in a herd eligible for test. Hitherto the number has been twelve. The change is warranted by the large number of applications, and to the satisfactory progress being made with the work. The Department is now prepared to receive applications from owners of herds containing a minimum of ten pure bred animals including a pure bred sire.

The Biological Laboratory of the Health of Animals Branch located hitherto at the Central Experimental Farm has been assigned new quarters on Cliff Street, Ottawa.

In Prince Edward Island a variety of barley has been produced that drops nearly all of its awns before harvesting. This variety, which is known as Charlottetown No. 80, originated at the Charlottetown Experimental Station and was obtained by selection from a locally grown barley known as Old Island Two-row. In comparison with other sorts it is a good producer, averaging about eight bushels more per acre than the average of the eight next best sorts tested at the Station during the past nine years. According to Mr. J. A. Clark, the Superintendent, this barley has practically replaced all other sorts in that province.

The report of the Dominion Apiarist supplies much interesting information relative to the prevention of swarming and regarding breeding experiments. Considerable work is being done at Ottawa in the rearing of queens. Last year 289 queens of select parentage were reared there, of which 125 were sent to private beekeepers, 69 to Duck Island for isolated mating, 51 were mated at Ottawa and introduced to the Central farm colonies, and 20 were mated at Ottawa and sent to branch farms. Much loss has been experienced of queens in transportation, but methods are being tried out by which it is hoped that this will be overcome.

During the last few years experiments have been carried on to determine which districts of Canada are suitable for flax fibre culture. These experiments have shown that the fibre obtained from flax grown on the Experimental Farms in the western part of British Columbia, in Ontario, the valley of the St. Lawrence, and the Maritime Provinces, is first class in quality, comparing favorably with the best grades of Irish or Belgian fibre. Especially gratifying is the fact that spinning tests have proved that from Canadian fibre can be manufactured the finest linen damasks.

Last year the Dominion Cerealist did considerable work with a view to ascertaining the best method of control of smut in oats, confining his experiments mainly to the Liberty variety which being hulless, cannot be treated with formalin. The work was conducted in co-operation with the Division of Botany of the Dominion Experimental Farms, which division is now continuing the investigation.

The Division of Economic Fibre Production of the Experimental Farms Branch makes careful test of newly invented pulling, deseeding or scutching machines, and furnishes information regarding their effectiveness. Tests of varieties, fertilizers, commermercial scutching, binder twine making, retting, and the recovery of flax tow are conducted. A system of grading has been adopted, and the examination a nd grading o

seed for export is undertaken. Another important arrangement is the despatching to flax growers, spinners, and any one interested in the production of flax for fibre, of the contents of cablegrams outlining conditions and prices prevailing in Europe received from the Irish Department of Agriculture.

Dominion Live Stock Commissioner states that Canada today has more nondescript hogs than she had ten years ago, and that the general lack of high quality is apparent in almost every province. In substantiation of this statement an estimate is made of the hogs that would probably grade as "Select" for bacon purposes. In Ontario and Prince Edward Island the figures are from 35 to 40 per cent; in Manitoba, from 30 to 35 per cent; in Quebec, from 20 to 25 per cent; in Saskatchewan, from 15 to 20 per cent, and in Alberta, from 10 to 15 per cent. This indicates pretty clearly the extent to which hogs are being bred to the bacon type in the several provinces.

The Dominion Live Stock Branch has received the following report from Slough, England, of the sale of 82 head Holstein-Friesian cattle, imported from South Africa. Mention of this sale was made in cable dispatches. The prices paid were remarkably high, the astonishing average of $5,651.39 and total of $469,090 being realized.

The top price was made by a fourteen month heifer Melrose Diliana for which $20,554 was paid. Harlons Marthus a twelve month bull headed the males at $18,642. The lowest price was $764.80 paid on a four day old calf. The twenty-eight bulls averaged $6,296 a total of $176,289.75 and the fifty-five cows and calves $5,323.65 a total of $292,800.75.

Jas. Telfer, District Sheep Promoter for Western Ontario, who has been actively engaged in dipping demonstration work for the past two years, has been most successful in the installation of community dipping tanks. Farmers co-operate in hauling the material, buying cement and providing the labour. The actual cost of tanks erected in this way, not counting labour, is six dollars. Forms are supplied, and the material required is one and a half yards sharp gravel, five bags of cement, and a few field stones.

The Bureau of Animal Industry of the United States Department of Agriculture has found that vitamins exist in the muscle fibre of beef, veal, mutton, lamb, and pork.

A booklet on Bird Protection, consisting of three lessons viz.: "The Value of Birds to Man," "How Birds are Protected" and "How Children can Assist," has been published by the Dominion Parks Branch of the Department of the Interior, Ottawa. These lessons are authorized for use in the schools of Canada and a copy is being mailed to every school.

The scouting work to determine the spread of the European Corn Borer during this season in southern Ontario began on July 24 with five crews engaged. The Province of Ontario will co-operate in carrying on this work as was done during the past two years.

Scouting work for the Alfalfa Weevil was started in Southern Alberta on July 1. Owing to the large amount of alfalfa being grown in this area, it was decided to determine whether this pest had invaded the alfalfa growing districts. The work is under the immediate supervision of Mr. H. L. Seamans of the Lethbridge Laboratory.

The scouting to determine the spread of the Apple Sucker in Nova Scotia was completed some little time ago. It was found that the pest had spread into quite a large area, particularly in a southerly and south-westerly direction. The work was carried on in co-operation with the Nova Scotia Department of Agriculture.

The importance of milk in the diet of both young and old is constantly being emphasized by the medical profession. Mal-nutrition or undernourishment, it should be understood, is not always the result of insufficient food, but frequently of unwisely and improperly chosen foods. This is supported by the fact that investigation has shown that a large percentage of under-nourished children are the offspring of well-to-do parents. The thoughtful mother will see that her children get plenty of milk from which to build a strong framework, develop mental capacity, and good health. Future happiness depends largely on these factors.

Each summer season the Dominion Department of Agriculture through the Dairy and Cold Storage Branch arranges with the railways in Canada for the operation of iced refrigerator cars for cheese shipments, the Department paying the cost of the icing up to eight dollars per car per week. Under this arrangement, the railway managements, upon proper application from shippers, furnish cars properly iced for the transportation of cheese in car loads, the minimum being 16,000 lbs., to Montreal for local delivery or for export. The arrangement also applies to less than car-load quantities shipped by one or more consignors from one station, when the aggregate weight is not less than the

minimum. That is, shippers can combine to make up a load. The agreement this year runs from June 5 to September 2.

One of the most progressive districts in Canada is that of Lake St. John, Quebec, reports the Dominion Dairy and Cold Storage branch. The people in the district depend largely on dairying and hog raising. Their farms are well and neatly kept, some wired and lighted by electricity, the barns having cement floors, iron stanchions, individual water bowls, and litter carriers. Last year 49 herds comprising 616 cows were tested around Metabetchouan and had an average of 5,207 lb. of milk and 205·7 lb. of fat. In the spring of this year the provincial dairy inspectors had organized testing centres comprising 637 herds and 8,847 cows. Cheese from this district is highly thought of in Montreal. The district is also noted for its scenery and its hunting and fishing.

All cheese making in Canada was carried on as a farm industry until 1864, when the first factory came into existence in Oxford county, Ontario. In the following year a factory was established in Missisquoi county, Quebec. The progress of factory establishment was so rapid that in a few years the system was generally adopted, and farm-made cheese became a rarity. While every one of the nine provinces has its cheese factories, about 97 per cent of the production has to be credited to Ontario and Quebec. Incidentally it might be mentioned that the total value of the cheese made in this country runs up to between thirty-five and forty million dollars per annum, and the quantity totals up to around a hundred and fifty million pounds, sometimes over and sometimes under. The variation in production is considerable, as will be understood when it is stated that in 1914 it was 169,478,340 lbs. and in 1920 nearly twenty million pounds less.

In Canadian factories the manufacture of cheese is mostly confined to what is known as Cheddar, but genuine Stilton is turned out on the Dominion Experimental Farm at Agassiz, B.C., and the Trappist monks at the Oka Agricultural Institute in Quebec make what is known as Oka cheese. Another form of cheese made in this country is Cottage cheese, which is made in many households from sour skim-milk without the aid of rennet. For cream cheese there is also a demand of some dimension.

The total quantity of dairy butter produced in 1921 in Canada was 122,776,580 pounds valued at $45,893,082. This is an increase in quantity over the previous year of 11,084,862 pounds. Increased production is shown by all the Provinces with the exception of Prince Edward Island, the largest proportionate increase, 36 per cent, being recorded by British Columbia. In order of dairying importance the Provinces rank: Ontario, Quebec, Alberta, Manitoba, Saskatchewan, Nova Scotia, British Columbia, New Brunswick, and Prince Edward Island.

In the first five months of the year 1920 Canada exported to Great Britain 24,477 long hundredweight of butter and 197,916 hundredweight of cheese. In the first five months of the present year we exported to the United Kingdom 170 hundredweight of butter and 94,248 hundredweight of cheese. The figures are enlightening but hardly flattering, especially in view of the fact that the exportations from Australia quadrupled, from New Zealand tripled, from Argentina were increased five-fold, and from Denmark, as regards butter, doubled. All the other exporting countries, including the United States, show a decrease. There is considerable hopefulness to be derived, however, from the fact that the butter imported into Britain from this country in the year 1913 amounted to only 813 hundredweight compared with 43,138 hundredweight in 1921, which makes it apparent, taking the figures previously quoted into account, that the early months of the year are not Canada's best for the exportation of butter across the seas. Great Britain last year imported 3,523,998 hundredweight of butter and as a shortage of the commodity is reported there, it would seem that Canada has an opportunity by supplying the English market to offset any loss of trade caused by the new tariff of the United States.

The Dairy News Letter, circulated by the Dairy and Cold Storage Branch, gives a satisfactory report of the advance of cow testing. In 1915, Alberta, British Columbia, and Manitoba were not included in the records and the average per cow tested was 5,285 lbs. milk and 195·5 lbs. fat. In 1919 the whole nine provinces, were included and the average was 5,522 lbs. milk, 207·9 lbs. fat. In 1921 the average, also for the nine provinces, was 5,801 lbs. milk and 214·1 lbs. fat. Manitoba stood at the head in milk production last year with an average of 7,317 lbs. milk and 228·9 lbs. fat, but British Columbia ranked first in fat with 6,392 lbs. milk and 276·5 lbs. fat. The other provinces—all of which showed an increase in averages excepting New Brunswick and Prince Edward Island, the latter's decrease being so slight as to be hardly worth mentioning—stood last year as follows: Ontario 7,136 lbs. milk, 245·8 lbs. fat; Prince Edward Island 6,569 lbs. milk, 242·1 lbs. fat; Alberta 7,048 lbs. milk, 229·6 lbs. fat; Saskatchewan, 6,861 lbs. milk,

227·8 lbs. fat; Nova Scotia, 5,283 lbs. milk, 216·8 lbs. fat; New Brunswick, 5,024 lbs. milk, 200·4 lbs. fat, and Quebec 4,946 lbs. milk, 192·3 lbs. fat. These averages show an advance resulting from the adoption of the system of testing, but the averages would be higher except for the cows that each year are tested for the first time. A number of herds show an average production of over 10,000 lbs. milk and 350 lbs. fat, while some of the herds average less than 4,500 lbs. milk and 150 lbs. fat, but both high and low show improved production under the method. In May, 1922, there were 1,318 herds and 11,922 cows recorded, compared with 1,264 herds and 11,456 cows in the same month last year.

Last year the production of apples in Nova Scotia amounted to 2,036,065 barrels, in New Brunswick to 33,000 barrels, in Quebec to 35,000 barrels, in Ontario to 885,065 barrels, and in British Columbia to 1,057,483 barrels; a total of 4,046,813 being an increase of 664,273 barrels over the production in the previous year. It is calculated that the acreage covered by potatoes this year in the nine provinces is 703,600, or 1,688 acres more than last year.

The small-fruit industry has made notable growth in British Columbia during recent years. An example of this is furnished by the acreage under strawberries which quadrupled in three years. This rapid development has however been accompanied by an equally rapid extension of insect injury, the strawberry root weevil having in some districts assumed serious proportions.

In 1918 an arrangement was arrived at by the Dominion Department of Agriculture with the provincial government for the use of six acres of land in the centre of the strawberry-growing district of Gordon Head, Vancouver Island, with a view to demonstrating systems of crop rotation suitable to strawberry culture and to elucidate if possible the problem of weevil control. The results of the experiments and investigation that have been carried on are told in Pamphlet No. 5, of the Dominion Department.

The Canadian Horticultural Council, which was recently organized with headquarters at Ottawa, has already taken steps towards the organization of a system for the registration of new varieties of plants. Through the agency of Mr. W. B. Lobjoit, Controller of Horticulture for Great Britain, the Secretary of the Canadian Horticultural Council will be kept informed of the efforts being made not only in England but on the Continent, to provide a means for the registration of horticultural plants, shrubs, and trees. The Secretary of the Council has also got into touch with the horticultural authorities in the United States who are interested in this matter. It is expected that a conference on the subject will be arranged for during the present year.

An investigation by the Canadian Horticultural Council with respect to the supply of nursery stock indicates that there will be a decided shortage of young fruit trees, particularly apple, pear, plum, and cherry, for planting this fall and next spring. The shortage will be greater than last spring when there was not enough planting stock to meet the demand. The shortage is understood to be due to the slackening of nursery work during the war years.

The demonstration farm maintained by the Ontario Department of Agriculture at Monteith in Northern Ontario, is to be abandoned. A larger acreage has been purchased at New Liskeard, where a permanent farm devoted principally to dairying will be operated. The object will be to benefit the settlers of the Temiskaming District and other parts of Northern Ontario where results secured will be applicable. The present Superintendent of the Monteith farm, C. M. Laidlaw, will go to New Liskeard to take charge of the institution.

The land and buildings at Monteith will be taken over by the Department of Education to be operated in connection with the school recently established there. This school has been so successful so far that applications to the capacity of the school for the coming year were received before the close of the present school year.

The Livestock Improvement Trains which ran in Manitoba from May 1 to 26, inclusive, were attended, according to the records kept, by a total of 31,374 persons. Of these 17,615 visited the C.N.R. train and 13,759 the C.P.R. train. The audiences were divided as follows: Men 8,838; women 5,710; boys and girls 16,826.

A total of 124 registered bulls were delivered from the two trains. More bulls could have been sold had it been possible to keep the supply up to normal on both trains at all times. The selection of the bulls was in the hands of the Live Stock Branch of the Dominion Department of Agriculture, and representatives of the various breed associations.

The Live Stock Improvement Trains of 1922 were pronounced a decided success. Their operation should react very beneficially upon the agriculture of Manitoba, not only in connection with the live stock industry itself, but also on farming in general.

The Department of Education of the Province of Saskatchewan is this year conducting a Team Demonstration Contest in Canning. The contest is open to Boys' and Girls' Clubs of the Province and to the Collegiate Institute and public schools of the city of Saskatoon, the Saskatoon Horticultural Society co-operating.

During the two years since Saskatchewan's egg legislation has been in force the quality of eggs marketed in the province has materially improved, and retail merchants, produce dealers and export buyers all testify to that effect, according to a bulletin entitled "Marketing of Eggs," recently issued by the Co-operation and Markets Branch of the Department of Agriculture.

To encourage individual cow testing and herd selection amongst Saskatchewan dairymen, the Saskatchewan Dairy Association in co-operation with the Dairy Branch is this year again conducting a greater average production competition.

During May of the present year 70 school districts in Saskatchewan received trees for school planting under the arrangement between the Department of Education and the Dominion Forestry Branch.

Figures covering the number of homestead entries in Saskatchewan show for 1921 a very heavy increase over 1920, the figures being 2,729 as against 1,841. A total of 7,335 immigrants arrived in Saskatchewan.

A soil survey is being made by the Alberta Department of Agriculture of the territory lying between Nanton and Medicine Hat and having a width of about thirty miles.

Plans which will put weed control in the Province of Alberta on a new basis, have been announced by the Provincial Department of Agriculture. The newly formed plans involve not only appointment of weed inspectors, but also contemplate courses of instruction for these inspectors, and a weed survey of the Province, which will provide a fund of practical knowledge concerning the weeds peculiar to each district, and methods for their eradication. W. J. Stephen, recently appointed crops commissioner for the Province, will have charge of the work.

In the provinces of Nova Scotia and Manitoba, cream is now being paid for on a graded basis. In Nova Scotia a compulsory system of grading cream at the creameries was introduced on May 1. In Manitoba the voluntary system has been adopted.

At the Annual Convocation of the University of Saskatchewan, 1922, Angus MacKay, Indian Head, Superintendent of Experimental Farms, had the degree of Doctor of Laws conferred upon him in recognition of his services to western agriculture.

Eight graduates of the University received the degree of Bachelor of Science (in Agriculture); two, Master of Science (in Agriculture); sixteen students received certificates of Associates in Agriculture, and seven in Household Science.

It has been the policy of the University to provide for the educational needs of the professions within the province. One of the first and possibly the most important decisions of the Senate and Governors was to provide for Agriculture within the University. In this respect Saskatchewan took the initiative in Canada. Two courses are provided in Agriculture—one the Associate Course for farmers' sons, who return to the farm. Since 1912, when the first course was opened, over 430 boys have entered this course. At least 90 per cent are now farming. The other, the Degree Course for specialists in Agricultural Science, has received 136, of whom 29 have taken degrees. This course prepares men for teaching, administrative positions, scientific work, and journalism. Some return to the farm.

At the University of British Columbia the student registration, by years, for the four-year course leading to a degree in Agriculture has been as follows:—1917-8, 7; 1918-19, 17; 1919-20, 45; 1920-21, 51; 1921-22, 73.

Extension schools are held at various centres, the cost of which is met by the Agricultural Instruction grant. In 1918-19 the total registration for these courses was 196; in 1919-20, 570; in 1920-21, 175; and in 1921-22, 732.

The Macdonald College announcement contains full details of the four-year course in agriculture, the "Winter" or one-year course in agriculture and poultry, and the courses in the School of Household Science and the Training-School for Teachers. An outline of the course of study followed is given in each case along with the entrance requirements, fees, etc. Students in the longer agricultural courses from Quebec receive a grant of $7 a month for each month of attendance during the course, and the Department of Agriculture of the Province of New Brunswick refunds the railway fares of students from that province who, having taken their first and second years at the Nova Scotia Agricultural College, attend Macdonald College to complete the four-year course leading to a degree.

E. G. Hood (O.A.C. 13) Lecturer in Bacteriology at Macdonald College recently received the degree of Doctor of Philosophy from Massachusetts Agricultural College.

The following are among the lines of research work being conducted at the University of Saskatchewan; The decay of concrete through effect of alkali; the soil survey work for the south-western part of the province; the rust investigation work now carried on for the third season, and the wheat breeding experiments carried on by Professor Thompson which is closely related to the rust investigation work. Professor Greig is continuing his research work in connection with wall insulation. Professor Potts is doing special work regarding the pasteurization of milk. A great number of varied experiments with corn, alfalfa, sweet clover and other forage crops, and with cereals, grass and vegetable crops are being carried on at the experimental farm.

Some very interesting research work is being carried on by Professors A. A. Cameron and J. S. Fulton with a species of tick, which is believed to be causing loss of life among live stock as well as big game in the northern part of the province.

The advantages of removing weed seeds from grain at the time the grain is threshed have been generally recognized. Nearly all threshing machines have sieves to remove weed seeds which are smaller than the grain being threshed, but some device for removing the wild oats, cockle, wild peas, and other large weed seeds would be of even greater benefit.

During the past twenty years many attempts have been made to build a recleaner which would clean the grain to a no-dockage basis. The United States Department of Agriculture became interested in this work four years ago, and the experiments developed at least one simple and practical recleaner for threshing machine use.

This year, ten threshing machines are being equipped with recleaners for removing the dockage from wheat and rye at the time the grain is threshed. The recleaners have been located at various points so that a wide range of harvest and threshing conditions will be encountered, and as many different sizes and types of separators have been equipped as can be properly supervised and their efficiency ascertained. Eight of the recleaners are of the disc type, one is of the sieve type commonly used in foreign countries, and the other is an aspirator designed and built by the office of Grain Investigations at Portland, Oregon. This work is being carried on by the United States Department of Agriculture in co-operation with the threshing machine Manufacturers

The American Committee for Devastated France is providing a three months' prize trip to Europe to the canning club girls of the United States. The trainers of the three winning teams will accompany the party. The 55,000 rural girls of the United States who are members of the girls' canning clubs, conducted by the Agricultural Colleges and the United States Department of Agriculture, are expected to compete in the contest. Eight weeks of the trip will be spent in visiting interesting places in France, and in demonstrating canning in the devastated regions under the supervision of the French Department of Agriculture and the American Committee for Devastated France.

The purpose of the contest, according to the regulations, is to encourage the preservation of all available products during the season of abundance; to emphasize, through canning, the importance of a well-rounded diet which will make for farm and rural home efficiency; to stimulate a greater interest in canning clubs, and to determine prize winners worthy of a trip to Europe and capable of demonstrating canning to the French people.

With the object of making the work of live stock judges at summer fairs more uniform, a live stock judges' conference arranged by the extension department at the College of Agriculture, Saskatoon, was held in July just previous to the summer fair season.

The plan with each class of livestock was first to have a demonstration, then present a group of animals for the judges to place, after which full discussion was invited. Interest was increased by the instructors calling on judges to give reasons for their decisions. About twenty-four judges attended.

Approximately one hundred and forty agricultural exhibitions are held in the province each year, and it is very essential that the judges keep up-to-date and maintain a high and uniform standard. Through these fairs, the judges exert a far-reaching influence on stock breeding in the province, and it is likely that such conferences as the one described will be held periodically henceforth.

At the annual meeting of the Royal Society last May, Mr. Arthur Gibson, Dominion Entomologist, was elected a Fellow of the Royal Society of Canada.

Dr. Link, Specialist in Market Pathology of the Bureau of Plant Industry, United States Department of Agriculture, recently visited the chief seed potato producing districts of British Columbia. He was accompanied by Mr. Tice, Potato Specialist of the Provincial Department of Agriculture. Mr. Tice and Dr. Link afterwards visited several districts in the State of Washington.

Dr. Link, whose visit was in connection with seed potato certification work and the virus diseases of potatoes, emphasized the necessity for the early rogueing and isolation of seed plots.

The Province of British Columbia is believed to have great possibilities as regards seed potato production, provided the precautions necessary to prevent disease are adopted.

APPOINTMENTS AND STAFF CHANGES

The position of Dominion Agrostologist formerly held by Dr. M. O. Malte, who resigned some time ago to take up work with the Geological Survey of the Department of Mines, has been filled by the appointment of Mr. Gordon P. McRostie, B.S.A., M.S.A., Ph.D. Born at Metcalfe, Carleton County, Ont., 1887. Graduate of Ontario Agricultural College, 1912. Agricultural Representative, Kent County, 1913-14. Graduate work at Cornell University, Ithaca, N.Y. Plant Breeder for New York State Bean Investigations, 1917-1920. Associate professor of Agronomy, Macdonald College, Quebec, 1920-1922.

Mr. Wm. Moynihan, V.S., formerly Veterinary Inspector at Toronto, has been appointed District Veterinary Inspector to fill the vacancy caused by the transfer of Mr. W. W. Stork, V.S. to Niagara Falls.

The Entomological Branch announces the appointment of Mr. K. M. King, B.Sc., as entomologist for Saskatchewan with headquarters at Saskatoon. The position in Saskatchewan has been vacant since the resignation of Dr. A. E. Cameron in 1920, owing to the fact that it has been impossible up to the present time to find a suitably trained man for the position. Mr. King received his training at the University of Washington and the Montana State College, and received his degree from the latter institution in 1920.

Mr. King has had about three years field experience in entomology and has worked on grasshoppers and the pale western cutworm in Montana; this training fits him particularly for his work in Saskatchewan. Since April 1920 he has been engaged with the Bureau of Entomology of the United States Department of Agriculture, working on insects affecting field crops.

Mr. King served with the United States army in France.

Mr. Frank L. Gabel, formerly fruit inspector at Hamilton for the Dominion Fruit Branch, has been promoted to the vacancy caused by the resignation of James L. Hastings as District Fruit Inspector for Western Ontario at Toronto.

The appointment is announced of Miss Jessie MacMillan as director of Women's Extension Work in Alberta. Miss MacMillan is a native of Aberdeen, Scotland, received her education in that city and at the Edinburgh School of Domestic Economy, and is stated to be exceptionally well qualified to look after the interests of women's organizations.

The co-operative experimental work carried on for the past year by farmers in all parts of the province in co-operation with the Provincial Department of Agriculture and the Field Husbandry Department of the University of Saskatchewan, has developed to such an extent that it has been found necessary to secure a director of co-operative experiments to supervise the work carried on, and Mr. Ernest G. Booth, a graduate of the University and president of the Saskatchewan Field Husbandry Association since its formation last year, has been appointed to this position.

ASSOCIATIONS AND SOCIETIES

MARITIME LIVE STOCK CONFERENCE

A conference of outstanding importance to the live stock industry of the Maritime Provinces was held at Moncton early in June. Those in attendance included the Deputy Minister of Agriculture for Canada, Dr. J. H. Grisdale, the Minister of Agriculture for Prince Edward Island, the Hon. W. M. Lea, the Secretary for Agriculture for Nova Scotia, Dr. M. Cumming, the Dominion Live Stock Commissioner, Mr. H. S. Arkell, the Director of the Dominion Experimental Farms, Mr. E. S. Archibald, the Deputy Minister of Agriculture for New Brunswick, Mr. Harvey Mitchell, and other officials both Dominion and Provincial. Dr. Cumming occupied the Chair.

The following resolutions were adopted:—

(1) Resolved that while recognizing that a progressive policy to assist Maritime stock breeders to market their surplus live stock during the fall months has already been put in force, mainly through the leadership of the Live Stock Branch of the Federal Department of Agriculture, we recommend that, as a further constructive measure, the services of an expert live stock market man be, if possible, secured to study movements of live stock to and from markets in the Maritime Provinces with a view to formulating a policy under which these provinces will supply a larger share of their local market needs with their own live stock and also lay the foundation for the further development of an export trade.

(2) Resolved that this convention recommend a greater flexibility on the part of Federal and Provincial Departments of Agriculture in respect to live stock improvement policies with a view to co-operatively adapting these policies to the special conditions in each of the provinces of the Dominion.

(3) Resolved that this convention recommend the appointment of more county or district agricultural representatives in the Maritime Provinces who shall co-operate with the Dominion Live Stock promoters in making their policies further reaching and more continuously effective.

(4) Resolved that this convention recommend that the various Departments advocate the dehorning of commercial beef cattle, either as calves or as mature cattle, and also dairy cattle.

(5) Resolved that this convention recommend that the various Departments co-operate in stimulating the use of high-class sires and a more rigid culling of females. By renewed and vigorous propaganda through the press and by departmental publications by active effort in the form of scrub bull campaigns when conditions seem at all favourable and by the construction, extension and co-ordination of pure bred sire policies of the provincial and federal departments of agriculture.

(6) Whereas the offering of prizes for a large number of breeds in any one class at exhibitions tends to hinder the concentration of breeders on a few of the best breeds;

Resolved that exhibition commissioners be urged to reduce as much as possible the number of breeds listed for prizes, and that the giving of prizes to breeds that are only represented in the Maritime Provinces by occasional herds be discontinued and that copies of this resolution be sent to all Superintendents of Live Stock and Exhibitions in the Maritime Provinces.

(7) Whereas the locations of the nearest live stock yards are at a greater distance from Maritime farmers than any other farmers in Canada;

And whereas for this reason, the Maritime Province stock raisers feel that they are being discriminated against;

And whereas this condition mitigates against the increased production of live stock;

Resolved that the railway authorities be requested to lower the rates on the shipment of live stock in general, so that they will be placed on equality with live stock raisers in other parts of Canada, and that a copy of this resolution be sent to the Minister of Railways.

(8) Whereas it is imperative that all departments and associations inaugurate active measures toward greater economy of production in live stock and live stock products; And whereas one means of assisting in such work is the availability of reliable information;

Resolved that the convention urge the publishing of two pamphlets, one emphasizing the results of the grading up of herds as carried on by the Experimental Farms in the Maritime Provinces and another giving experiences of our Maritime farmers who have used silos together with cost of construction, etc.

(9) Whereas many farmers in the Maritime Provinces find it difficult to secure abundant roughage; And whereas the value of succulent feed for winter

feeding of cattle has been fully demonstrated; And whereas a larger amount of succulent roughage would reduce the present heavy expense of buying western grain;

Resolved that the use of silos in the Maritime Provinces should be encouraged in every way possible, the crops to be used may vary in different localities, but corn, O.P.V. sunflowers and clovers should be stressed, and that the growing of larger areas of roots should be encouraged where silage crops are not adapted and that some turnips be grown if possible even where silage is the main succulent roughage.

(10) Whereas this convention considers that in order to facilitate the marketing of live stock and its products that cold storage is absolutely necessary;

Resolved that this convention request the Federal Government to give financial assistance in the establishing of one or more cold storage plants in each province.

(11) Whereas it is the opinion of this convention that co-operative shipping of live stock has been satisfactory to shippers in the past;

Resolved that this method of marketing be continued and furthermore that associations be organized and the contract system of selling introduced.

(12) Resolved that if any or each of the Maritime Provinces desire to make a trial shipment of veal to the New York, Boston or Montreal markets and make arrangements for assembling a carload at any central point that the Federal Department of Agriculture be requested to take charge and bear the expense of killing, cooling and placing same on the market.

(13) Whereas it is the opinion of this convention that hogs of the bacon type only should be raised in the Maritime Provinces and only one breed of that type;

Resolved that this convention do recommend farmers to breed Yorkshire hogs only; and that the Provincial Departments of Agriculture be asked to strongly encourage farmers to produce hogs of the Yorkshire breed rather than any other.

(14) Resolved that the number of roughages fed to our live stock should be increased to avoid the result that follows the failure of any one crop. Several roughages have been proven much better than the feeding of a single one. Special emphasis is therefore laid on the growing of roots, silage crops and clover.

(15) Resolved that the importance of home-grown grains should be stressed with special emphasis on the importance of oats, barley and mixed grains as stock feeds in order that the cost of production may be lowered.

(16) Whereas the under-feeding of live stock results in heavy loss from the fact that the whole ration must be used for maintenance of the animal, leaving nothing or little to be applied to gain in weight or for milk production; And whereas the marketing of thin beef results in a loss in pounds and in price per pound; And whereas this under-feeding is largely the result of more live stock being carried than can be well fed by the amount of feed the farmers are producing;

Therefore recommend that the farmers be encouraged to keep only so much stock as can be supplied with an abundance of feed, and that every effort be made to impress upon farmers the advantages of liberal feeding.

(17) Whereas the live stock records show that the dairy cow and the hog are able to produce the maximum product and profit on feeds available and also that on the majority of farms, conditions justify farming with these classes of stock;

Resolved that this convention take all possible steps toward promoting the continuous production of dairy cattle, the finishing of veal where profitable and the rearing of hogs as an adjunct to dairying. And that in these more limited districts primarily suited to beef and sheep production that the convention take active steps to encourage better breeding and feeding for a higher market finish.

(18) Resolved that this convention recommend that pure bred rams of the Down breeds be used exclusively on all flocks in the Maritime Provinces; And further that since it has been proven that docked and castrated lambs sell to better advantage than lambs not docked and castrated: Therefore we strongly recommend (1) that the practice of docking and castrating be carried out by all sheep breeders in the Maritime Provinces; (2) that the practice of dipping be strongly recommended; (3) that lambs be finished to from 75 lbs. to 95 lbs. before marketing.

CANADIAN SEED GROWERS' ASSOCIATION

The annual meeting of the above Association was held at Macdonald College, Ste. Anne de Bellevue, P.Q. on June 26. In the report of the Board of Directors, it was shown that the number of growers operating in connection with the Association has reached the very creditable number of almost 4,000. In addition to these, it was pointed out that there are many hundreds of farmers throughout Canada who are producing and selling high class seed independent of the Association, but by reason of having been affiliated with it at one time. The amount of Registered Seed produced has reached several hundred thousand bushels. The report indicated that the quantity produced could be increased very largely were proper

facilities provided for handling, marketing and financing the crop. The report of the President indicated that the time has come when some definite action should be taken to overcome this difficulty. The matter was thoroughly discussed at the meeting and following resolution passed:—

"Whereas, the C.S.G.A., a body incorporated without share capital and not permitted to do business with the purpose of financial gain for its members, has grown and developed since its inception twenty years ago until it has to-day over 4,000 active members with an annual production of Registered Seed and Extra No. I Seed of several hundred thousand bushels; and, whereas, it is of the greatest National importance that an adequate supply of this class of seed for the needs of the country be assured annually; therefore, be it resolved, that this Association place itself on record as favouring the formation of allied but distinct and separate organizations incorporated to do business and whose primary function shall be directly or indirectly to assemble, reclean, store, finance, and market Registered and Extra No. I seed. The Association, therefore, recommends for the consideration of the Ministers of Agriculture of the respective Provinces that warehouses be constructed at convenient centre or centres and made available to seed growers co-operatives on the basis of service at cost after the general plan of the Canadian Government Interior Terminal Elevators for the assembling, storing, clearing, grading and marketing of Registered and Extra No. 1 Seed grain and other seeds by Provincial or district growers co-operatives, and of the Minister of Agriculture for Canada, that, pending the organization of a Canadian Seed Growers' Co-operative, the Seed Purchasing Commission be given authority to take delivery of the surplus Registered and Extra No. 1 seed grain that has been assembled, cleaned, graded, sacked, and held in storage by Provincial Seed Growers' Co-operatives for sale on the volunteer, pooling or other system of co-operative marketing, make reasonable financial advance on same against approved documents, and provide the service of selling and distributing the seed for a moderate commission charge to cover the cost of the service, and to return the net proceeds of sale to the Provincial or district co-operatives for distribution by them to their seed growers."

CANADIAN SOCIETY OF TECHNICAL AGRICULTURISTS

The second annual convention of the Canadian Society of Technical Agriculturists was held at Macdonald College, P.Q. from June 26 to July 1. A new and important feature was the series of advanced lectures on rural economics, genetics, and animal and plant nutrition. An excursion to the Oka Agricultural Institute concluded the programme. The attendance was good, and the convention was a success in every way.

One of the actions of the convention was the appointment of a committee on Educational Policies, with President L. S. Klinck of the University of British Columbia as chairman. The committee, which comprises a representative from each of the provinces, will make a survey of the conditions regarding agricultural education from the rural schools to the colleges of agriculture and will report at the next annual convention.

The executive was by resolution requested to address the Civil Service Commission with a view to obtaining a reconsideration of the classification of agricultural technicians comparable with that of other professions.

Other resolutions passed included one favouring the establishment of a National Research Institute as being essential to the economic development of the Dominion; and one commending the policy and practice of agricultural departments, federal and provincial, of employing in all technical positions men who have had finished training in technical agriculture.

With regard to the Bureau of Records, the General Secretary reported that the number of enquiries so far received from employers has been very small, and in almost every instance these enquiries had called for a man with special, or graduate, training. On the other hand the number of enquiries from registrants seeking positions had been much larger, and always from men who had no training beyond that leading to the B.S.A., degree plus, subsequent professional experience. For this reason the value of the Bureau has been minimized. The men seeking positions could not be placed; the employers seeking men could not find them at the salaries offered, among the registrants.

Government employment did not demand the B.S.A. man in any line of work to the extent that they were required a few years ago. Specialists were called for. This meant that the C.S.T.A. Bureau, to be thoroughly efficient, must include among its registrants a fairly large percentage of highly trained men, which was not the case now. The Society might, it was stated, also attempt to develop new fields for employment for the B.S.A. At present the graduate in agriculture was looked upon, in some quarters, as a book-learned individual, unpractical and inexperienced. This opinion could be largely removed by publicity, and by encouraging commercial firms, co-operative organizations, and other similar institutions, to employ agricultural graduates.

The Society has been admitted to affiliation with the American Association for the Advancement of Science, and selected Dr. W. H. Brittain, of Truro, N.S., as its representative on the Council of that body.

A fellowship was conferred on Dr. L. S. Klinck, the retiring President.

Honorary membership was conferred upon His Excellency, Baron Byng, Governor General.

The Special Committees, with their chairmen, are as follows:—*Marketing Education*, Professor A. Leitch, Ontario Agricultural College, Guelph; *Graduate Studies*, Professor Newton, University of Alberta Edmonton; *Research*, Dr. J. F. Snell, Macdonald College; *Educational Policies*, Dr. L. S. Klinck, President, University of British Columbia, Vancouver.

The Dominion Executive of the society is composed as follows:—President, J. B. Reynolds, president of the Ontario Agricultural College, Guelph; vice-presidents, Professor H. Barton, Macdonald College; Jules Simard, Dominion Seed Branch, Quebec; hon. secretary, L. H. Newman, secretary of the Canadian Seed Growers Association, Ottawa; provincial representatives, Alberta, D. H. Galbraith, M.L.A., Vulcan; British Columbia, F. E. Buck, University of British Columbia, Vancouver; Manitoba, A. C. McCulloch, Winnipeg; New Brunswick, J. H. King, Moncton; Nova Scotia, Dr. W. H. Brittain, Truro; Ontario, Arthur Gibson, Dominion Entomologist, Ottawa; Prince Edward Island, J. A. Clark, Experimental Farm, Charlottetown; Quebec, A. Désilets, Department of Agriculture, Quebec; Saskatchewan, J. G. Robertson, Live Stock Commissioner, Regina; general secretary and editor, Fred H. Grindley, P.O. Box 625, Ottawa.

The next annual convention will be held at Saskatoon.

EASTERN LIVE STOCK UNION

In order to promote, encourage and develop the live stock industry, the Eastern Canada Live Stock Union was formed. The Union is a combination of many different organizations engaged in the rearing of livestock and the handling of livestock products, its objects being:—(a) To establish an organization of pure bred and commercial live stock producers; (b) To stimulate economic progress in livestock production and marketing; (c) To co-ordinate the interests of pure bred and commercial producers and handlers of livestock and its products; and, (d) to promote education, co-operation and leadership in the livestock fields.

"The Union may consist of the following Associations interested in livestock and livestock productions of Ontario, Quebec and the Maritime provinces, which have paid the current year's membership fees: (a) Livestock record organizations; provincial livestock associations; farmers' organizations and co-operative companies or associations; (b) Dominion and provincial Departments of Agriculture; (c) railway companies; bankers' associations; livestock commercial organizations; meat packers' associations; agricultural fair associations; (d) such other organizations as are approved by the Executive Committee."

Owing to the complex nature of the work of the Live Stock Union it was thought advisable to form committees which, while being under the authority of the parent body, are engaged in special work. The Commercial Committee is composed of representative shippers, transportation officers, farmers, representatives of the packing plants, livestock buyers, railway livestock agents, officers of stockyards and an officer of the Humane Society, who are experts in their different lines, and who are, by training, especially qualified to deal with such questions as affect the shipping, transportation, humane handling and other kindred problems pertaining to livestock.

The Swine Committee is composed of prominent men connected with the swine industry. The efforts of the Dominion Department of Agriculture to inaugurate a system of selling hogs by grade, whereby a premium will be paid to those who produce the proper type of bacon hog, bids fair soon to become effective. When this system becomes operative, the work of this Swine Committee will be most important. President, C. W. Gurney; Secretary-Treasurer, J. D. Brien, York Building, Toronto.

CONFERENCE OF ONTARIO AGRRICULTURAL REPRESENTATIVES

The fifteenth annual conference of the Agricultural Representatives of the Ontario Department of Agriculture was held at Cobourg, July 4-7.

The conference functioned through Committees dealing with improvements and alterations in the various lines of work undertaken. The committees reported on the following matters:—Boys' and Girls' club work; Cattle Improvement; Acre Profit and Animal Feeding Competitions; Swine Improvement; Experiments and Demonstrations; Judging Competitions; Horse Improvement; School Fairs; Report of committee sent by the department to investigate the county agent and farm bureau work of the State of Michigan.

Miss K. A. McIntosh, Home Demonstrator for Peel county reported on her work since her appointment in 1918. Some 359 meetings, aggregating 15,800 persons had been addressed and 2,820 persons had called at the office for advice.

Resolutions were passed recommending an extension by the Dominion Department of Agriculture of the food inspection service to those centres where no inspection is provided; suggesting the desirability of holding an annual conference in Northern Ontario having regard to the great agricultural possibilities of the country and the general lack of knowledge as to its extent and resources.

WESTERN PLANT QUARANTINE BOARD

At the meetings of the Western Plant Quarantine Board which were held in Sacramento, California, on May 31 and June 1, 2 and 3, Canada was represented by Mr. W. H. Lyne, Chief Plant Products Inspector for British Columbia and Mr. L. S. McLaine, Secretary of the Destructive Insect and Pest Act Advisory Board, Department of Agriculture, Ottawa. The Western Plant Quarantine Board was organized in 1919 for the purpose of bringing together the quarantine officials of the various western states and British Columbia, in order to bring about a better understanding of quarantine conditions.

Representatives were present from the Federal Horticultural Board, Washington, D.C., Arizona, California, Canada, Colorado, Hawaii, Idaho, Lower California, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. The first day of the meetings was devoted to a "Hearing," with the Representatives of the Federal Horticultural Board, on problems pertaining particularly to the western states, the main topics were the Mediterranean Fruit Fly, White Pine Blister Rust and the Alfalfa Weevil. The following sessions were devoted to papers and general discussions on problems affecting particularly the western United States and Canada. All states are endeavouring to check the spread of the Alfalfa Weevil as much as possible, not only by the establishment of embargoes and quarantines on plant products likely to harbour this pest, but many states inspect the equipment of "auto campers" entering their territory and coming from regions infested by this insect. Canada is particularly interested in the Alfalfa Weevil, owing to the rapid development of the alfalfa industry in the prairie provinces and British Columbia.

The Honourable G. H. Hecke, Director of the State Department of Agriculture of California, entertained the delegates and guests at a reception at his estate "Yolanda," Woodland.

WESTERN CANADA IRRIGATION ASSOCIATION

The Sixteenth Annual Convention of the Western Canada Irrigation Association was held at Maple Creek, Saskatchewan, and Brooks, Alberta, from July 25 to July 29.

The growth of the interest in irrigation was indicated by the large attendance at the convention, more than 375 delegates and guests registering. Valuable addresses were given by many able speakers on various subjects dealing with irrigation agriculture and irrigation engineering. Among the speakers were Don. H. Bark, Dean Howes, F. W. Hanna, Geo. H. Hutton, Professor Roy Hanson, G. N. Houston, W. C. Muldrow, Manager of the Columbia Irrigation District, Washington, Walter Packard, Superintendent of the Durham Colony Settlement in California, and I. D. O'Donnell, of Billings, Montana.

Those attending the convention had an opportunity of seeing some of the results of irrigation development at Brooks. Though settlement here is very recent a remarkable transformation has already been effected in a short time. Trees are growing rapidly, while grain and green alfalfa fields meet the eye everywhere.

Resolutions were passed dealing with further irrigation extension, better weed control, and the providing of courses in irrigation engineering at the Western universities. Penticton, British Columbia, was chosen as the place of meeting for the convention in 1923.

The Ontario Co-operative Dairy Products Limited—Officers: President, Jno. Beatty, Mallorytown; Vice-President, D. Hogan, Perth; Secretary-Treasurer, E. H. Stonehouse, Weston; Members of Executive Committee: J. A. McFeeters, Toronto; W. W. Ballantyne, Stratford; Wm. Newman, Lorneville; D. L. Gibson, Caledonia; A. H. Clark, Mountain; Geo. Smith, Iroquois.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Cereal Division, 1921.—Interim Report of the Dominion Cerealist, C. E. Saunders, B.A., Ph.D., LL.D., Dominion Experimental Farms.

Bee Division, 1921.—Interim Report of the Dominion Apiarist, C. B. Gooderham, B.S.A. Dominion Experimental Farms.

Division of Illustration Stations, 1921.—Interim Report of the Chief Supervisor, J. Fixter. Dominion Experimental Farms.

Experimental Station, Scott, Sask., 1921.—Interim Report of the Superintendent, M. J. Tinline, B.S.A. Dominion Experimental Farms.

Experimental Farm, Agassiz, B.C., 1921.—Interim Report of the Superintendent, W. H Hicks, B.S.A. Dominion Experimental Farms.

Experimental Station, Invermere, B.C., 1921.—Interim Report of the Superintendent, R. G. Newton, B.S.A. Dominion Experimental Farms.

Dressing and Cutting Lamb Carcases.—By A. A. MacMillan, B.S.A., Chief, Sheep and Swine Division, and W. J. Howard, Meat Demonstrator, Live Stock Branch. Pamphlet No. 8—New Series.

Insects Affecting Greenhouse Plants.—By Arthur Gibson, Dominion Entomologist, and W. A. Ross. Bulletin No. 7—New Series.

Bovine Tuberculosis.—Pamphlet No. 16.—New Series. Health of Animals Branch.

Selection of Lamb Cuts.—Directions for cooking. By A. A. MacMillan, B.S.A. Chief, Sheep and Swine Division, Live Stock Branch. Pamphlet No. 9—New Series.

Feeds for Wintering and Winter Fattening of Beef Cattle in Eastern Canada.—By G. W. Muir, B.S.A., Animal Husbandman. Exhibition Circular No. 106. Dominion Experimental Farms.

Growing Feeds for the Winter Feeding of Beef Cattle in Northwestern Saskatchewan.—By M. J. Tinline, B.S.A. Exhibition Circular No. 107. Dominion Experimental Farms.

Fertilizers for Field Crops.—Their Nature Functions and Results from Recent Experiments in Canada. By Frank T. Shutt, M. A., D.Sc., and B. Leslie Emslie, C.A.D., F.C.S., Division of Chemistry. Bulletin No. 8—New Series. Dominion Experimental Farms.

Keeping Dairy Herd Records.—Pamphlet No. 13—New Series. Dairy and Cold Storage Branch.

Illustration Community Work in Dundas County, Ontario.—By F. C. Nunnick, B.S.A., Chief, Division of Extension and Publicity, Dominion Experimental Farms Branch. Reprint from Agricultural Gazette, July-August.

List of Wholesale Dealers in Fruits and Vegetables in Canada.—(Revised edition). Compiled by the Fruit Branch. Bulletin No. 9—New Series.

Record of Performance for Poultry.—Section "A." Rules and Regulations, Record Year 1922-23. Poultry Division, Live Stock Branch.

How to Caponize.—By Geo. Robertson, Assistant Dominion Poultry Husbandman, and W. W. Lee, Poultry Husbandman, Pamphlet No. 12—New Series. Dominion Experimental Farms.

Mosaic and Leaf Curl of the Cultivated Red Raspberry.—By W. H. Rankin, Ph.D., and J. F. Hockey, B.S.A., Laboratory of Plant Pathology, St. Catharines, Ont. Circular No. 1—New Series. Division of Botany, Dominion Experimental Farms.

Root and Storage Cellars.—By A. V. Nicholson, Draughtsman, Central Experimental Farm. Pamphlet No. 10—New Series.

The Morphology and Biology of a Canadian Cattle-Infesting Black Fly.—By A. E. Cameron, M.A., D.Sc., F.E.S., Entomologist-in-charge for Saskatchewan. Bulletin No. 5—New Series.

Experimental Station, Fredericton, N.B. 1921.—Interim Report prepared by E. M. Taylor, B.S.A., Assistant to Superintendent.

ONTARIO

Live Stock Branch, 1290.—Annual Report.

Entomological Society of Ontario, 1920.—Fifty-first Annual Report.

Stallion Enrolment Board of Ontario.—Report 1921.

Ontario Vegetable Growers' Association, 1921.—Seventeenth Annual Report.

Agricultural Societies, 1921.—Appendix to Annual Report. Results of competitions in Standing Field Crops and Prize-winning Grain at Winter Fairs, Canadian National and Central Canada Exhibitions.

Silos and Silage.—By L. Stevenson, B.S. A., M.S. Bulletin No. 287.

Flour and Breadmaking.—By R. Harcourt and Miss M. A. Purdy. Bulletin No. 285. Revised edition of No. 180.

QUEBEC

Annual Meeting of the Pomological and Fruit Growing Society, 1921.—Supplement to the report of the Minister of Agriculture.

MANITOBA

Annual Report of the Department of Agriculture and Immigration, 1921.

SASKATCHEWAN

Community Buildings.—Bulletin No. 70. Co-operation and Markets Branch.

Marketing Eggs in Saskatchewan.—Bulletin No. 69. Co-operation and Markets Branch.

ALBERTA

The Summerfallow in Southern Alberta.—By James Murray, District Agent, Agricultural Department, Medicine Hat.

BRITISH COLUMBIA

Agricultural Statistics, 1921.—Bulletin No. 89.

Peat and Muck Soils.—By Wm. Newton, Chief Soil and Crop Inspector. Circular No. 39.

MISCELLANEOUS

Three Lessons on Bird Protection.—Issued by the Dominion Parks Branch, Department of the Interior.

The Protection of Bird Neighbours.—By Hoyes Lloyd.

The Birds of a Manitoba Garden.—By Norman Criddle.

Canada's Feathered Friends.—By Hoyes Lloyd.

Birds a National Asset.—Views of Provincial Ministers of Agriculture. Dominion Parks Branch, Department of the Interior.

Bird Houses and Their Occupants.—By P. A. Taverner.

The Canadian Swine Breeders' Record.—Volume 32, 1921. Compiled and edited in the office of the Canadian National Live Stock Records.

The Canadian Jersey Cattle Club Record.—Volume 5, 1922. Compiled and edited in the office of the Canadian National Live Stock Records.

Canadian National Records for Sheep.—Volume 10, 1921. Compiled and edited in the office of the Canadian National Live Stock Records.

Holstein-Friesian Herd Book.—Volum-25. Containing a record of all Holsteine Friesian cattle.—W. A. Clemons, Secretary and Editor.

THE LIBRARY

LIST OF PRINCIPAL ACCESSIONS TO THE DEPARTMENTAL LIBRARY, INTERNATIONAL INSTITUTE BRANCH, DEPARTMENT OF AGRICULTURE

Cyclopedia of Farm Animals, edited by L. H. Bailey. Toronto, Macmillan company of Canada, 1922. 708 pp. il.

Weather Prediction by Numerical Process, by Lewis F. Richardson. Cambridge University press, 1922. 236 pp. diagrs.

Refrigeration, Cold Storage and Ice-making, by A. J. Wallis-Taylor 6th edition, revised. London, Crosby Lockwood & son, 1920. 652 pp. il. diagrs.

Les Dommages Causés aux Cultures par les Usines d'Electro-chimie, par Dr. Henry Faes. Paris, Librairie Payot et cie. 1921. 104 pp.

The Fiscal and Diplomatic Freedom of the British oversea dominions, by Edward Porritt. Oxford, Clarendon press, 1922. 492 pp. (Carnegie Endowment for International Peace).

Field Key to the Genera of the Gill Mushrooms, by Louis C. C. Krieger. Baltimore, Norman, Remington co. 1920.

North America; its Agriculture & Climate, by Robert Russell. Edinburgh, Adam & Charles, 1857. 390 pp. maps.

Art Out-of-Doors, by Mrs. S. Van Rensselaer. New York, Charles Scribner's sons, 1893. 399 pp.

Concrete Products, their Manufacture and Use, by W. R. Harris and H. C. Campbell. Chicago, International trade press, 1921. 282 pp.

Meteorology; an Introductory Treatise, by A. E. M. Geddes, O.B.E., M.A., D.Sc. Lecturer in natural philosophy in the University of Aberdeen. New York, D. Van Nostrand co. 1921. 390 pp. il.

English Farming, Past and Present, by The Right Hon. Lord Ernle, President of The Board of Agriculture & Fisheries, 1916-19. New York, Longmans, Green & co. Third Edition, 1922.

The Feeding of Dairy Cattle, by Andrew C. McCandlish, M.S.A., Professor of Dairy Husbandry, Iowa State College. New York, John Wiley & sons, 1922. 281 pp. il.

Why Europe Leaves Home, by Kenneth L. Roberts. Indianapolis, Bobbs-Merrill co. 1922. 356 pp. il.

Helping Men Own Farms, by Elwood Mead, Professor of rural institutions, University of California. Toronto, Macmillan co. of Canada, 1920. 228 pp. il.

Organizing the Community: A Review of Practical Principles, by B. A. McClenahan, M.A., Asst. Director, Missouri School of Social Economy, St. Louis. New York Century Co. 1922. 260 pp.

Physico-Chemical Problems Relating to the Soil; a general discussion held by the Faraday Society. (Reprinted from the Transactions of the Faraday Society, Vol. 17, Feb. 1922. p. 317-268).

Les Engrais; Emploi Raisonné et Lucratif, par A. Ch. Girard, Professeur à l'Institut National Agronomique. Paris, Librairie agricole de la maison rustique, 1922. 164 pp.

Le Rôle de L'Osmose en Biologie; Essai de Physique Végétale, par Leclerc du Sablon. Paris, Ernest Flammarion, 1920. 190 pp.

Lecture on Modern Applications of Chemistry to Crop Production, by Dr. E. J. Russell, O.B.E., D.Sc., F.R.S. (Director of Rothamsted Experimental Station) London, 1922. 23 pp.

Potash, by Sydney J. J. Johnstone, B.Sc. (London) A.E.C., Scientific and Technical Department, Imperial Institute. London, John Murray, 1922. 122 pp. Bibl. pp. 114-122. (Monographs on mineral resources with special reference to the British Empire).

A Textbook on Tobacco, by Carl Werner. New York, Tobacco Leaf Publishing Co., 1914. 323 p., il.

The American Rose Annual, 1921, edited by J. H. McFarland. Harrisburg, Pa., American Rose Society, 1921. 192 p., il.

The American Rose Abnual, 1922, edited by J. H. McFarland. Harrisburg, Pa., American Rose Society, 1922. 192 p. il.

The Fundamentals of Fruit Production, by V. R. Gardner, F. C. Bradford and H. D. Hooker, Jr. of the Dept. of Horticulture, University of Missouri. New York, McGraw-Hill Book Co., Inc., 1922. 686 p. il.

The Hand Book on Pruning, Grafting and Budding, by James Udale, Chief Horticultural Instructor for Worcestershire. Evesham, England, W. & H. Smith, Ltd., fifth edition, 1921. 146 p. il.

Landscape Gardening, Designed Especially. for the Use of Non-Professional Students, by Frank A. Waugh. New York, John Wiley & Sons, Inc. 1922. 344 p. il.

Common Plants, by Macgregor Skene, D Sc., Lecturer on Plant Physiology, Aberdeen University. New York, Andrew Melrose, Ltd., 1921. 271 p. il.

La Laiterie, par Louis Ammann, Professeur a l'Ecole de Grignon. Paris, Librairie agricole de la Maison Rustique, 1922. 630 p. paper.

Dairy Farming on Arable Land. Liverpool, R. Silcock & Sons, Ltd. 144 p.

Dairy Farming, by J. C. Newsham, Principal of Monmouthshire agricultural Institution. London, C. Arthur Pearson, Ltd., 1920. 174 p.

Dairying in the Netherlands; a Study and a Comparison, by R. A. Whyte, Inspector, Dept. of agriculture and technical instruction for Ireland. Dublin, Alex. Thom & Co., Ltd., 1922. 36 p. il.

The Book of Ice-Cream, by Walter W. Fisk, Assistant Professor of Dairy Industry, New York State College of Agriculture. Toronto, The Macmillan Co., 1919. 302 p. il.

The Book of Live Stock, by Wade Toole, B.S.A., Professor of Animal Husbandry, Ontario Agricultural College. Toronto, Musson Book Co., Ltd., 1921. 381 p. il.

Insect Pests of the Horticulturist: Their Nature and Control. Vol. I. Onion, carrot and celery flies, by K. M. Smith, A.R.C.S., D.I.C. adviser in agricultural entomology, Manchester University, and J. C. M. Gardner, A.R.C.S., D.I.C., F.E.S. Imperial College of Science and Technology, South Kensington. London, Benn Bros., Ltd., 1922.

Insect Pests of Farm, Garden and Orchard, by E. Dwight Sanderson & L. M. Peairs. New York, John Wiley & Sons, Inc. 1921. 707 p. il.

Catalogue of Indian Insects, Part I. Acrydidae (Tettigidae), by T. Bainbrigge Fletcher, R.N., F.L.S., F.Z.S. Calcutta, Government printing, 1921. 40 p.

Habitudes et Métamorphoses des Insectes, par E. L. Bouvier. Paris, Ernest Flammarion, 1921. 321 p.

European Animals: Their Geological History and Geographical Distribution, by R. F. Scharff, Ph.D., B.Sc. London, Constable & Co., Ltd., 1907. 258 p. il.

British Animals Extinct Within Historic Times, by James Edmund Harting, F.L.S., F.Z.S. London, Trubner & Co., 1880. 258 p. il.

Comparative Electro-Physiology-Physico-Physiological Study, by Jagadis Chunder Bose, M.A., D. Sc. New York, Longmans, Green & Co., 1907. 760 p.

Organization—Publicity Plan Book for County Farm Bureaus. Chicago, American Farm Bureau Federation, 1922. folio.

Organized Produce Markets, by J. G. Smith, M.A. (Dublin), Assistant Professor of Commerce, University of Birmingham. Toronto, Longmans, Green & Co., 1922. 238 p.

The Public Service in War and Peace, by Sir William Beveridge, K.C.B. London, Constable & Co., Ltd., 1920. 63 p.

Deutsches Worterbuch, by Moriz Heyne. Leipzig, S. Hirzel, 1905. 3 vols.

A Dictionary of Scientific Terms, by I. F. Henderson, M.A., and W. D. Henderson, M.A., B.Sc. London, Oliver and Boyd, 1920. 354 p. cloth.

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PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

International Year Book of Agricultural Statistics for the Years 1909 to 1921.—International Institute of Agriculture. 700 pages. Rome, Italy, 1922.

The most complete work of its kind published. Contains statistics of territorial areas, population, density for years nearest to 1911 and 1921. Territorial areas subdivided agriculturally (1) into productive and non-productive land, with details for years nearest to 1911 and 1921: (2) subdivisions of productive area for years mentioned: (3) subdivisions of arable land on similar basis. Crop areas and yields—(1) area, production and yield per hectare of each country and in each year from 1909 to 1921, for wheat, rye, barley, oats, maize, rice, potatoes, sugar (beet and cane), vines and wine, olive, coffee, cocoa, tea, hops, tobacco, cotton, flax, hemp, jute, rapeseed mulberry, silk production in various stages; (2) area, production and yield per hectare as above, averaged in periods 1909 to 1913, 1914 to 1918 and 1919 to 1921, in each country, each continent and for the world in general, with proportionate percentages. Live stock—(1) numbers of horses, asses, mules, cattle and buffaloes, sheep, goats, pigs and other animals in each country and each year from 1909 to 1921; (2) number, as above, for years nearest to 1911 and 1921, in each country and continent and for the world in general, compared with population and areas. International trade in products of the soil—(1) imports and exports for each country and year from 1909 to 1921, wheat, wheat flour, rye, rye meal, barley, oats, maize, rice, potatoes, grapes, raisins, olive oil, coffee, tea, cocoa, hops, cotton, jute, linseed, rubber; (2) imports and exports as above, averaged in periods 1909 to 1913, 1909 to 1918, 1919 to 1921 for each country and continent and for the world in general. Prices—weekly prices during the years 1912 to 1921 on the leading markets: wheat, rye, barley, oats, maize, rice, sugar, coffee, tea, cocoa, cotton. Ocean rates of freight for grain and cotton—weekly quotations during the years 1912 to 1921 on the principal traffic routes. Fertilizers and products utilized in agriculture—output in each country and year from 1909 to 1921; natural phosphates, super-phosphates of lime, basic slag, guano, salts of potash, nitrate of soda, nitrate of lime, sulphate of ammonia, cyanamide of calcium, sulphur, sulphate of copper; (2) imports and exports for each country and year from 1909 to 1921; (3) weekly prices during 1918 to 1921 on the leading markets. Rates of exchange and tables of equivalents.

The Year Book is arranged for the use of both English and French readers. It may be obtained from the Secretary-General, International Institute of Agriculture, Rome, Italy. Price $2.

Agricultural Research and the Farmer.—WILKINS, V. E. Published by *The Ministry of Agriculture and Fisheries*, London, England. 1922.

Describes in non-scientific language the main lines of agricultural research now in progress in Britain. In his introduction the author explains the meaning of the term "research" as follows: "The word is often used by agriculturists in reference to any investigations which have as their object the improvement of existing practice. Thus experimental work in manuring, the testing of varieties, and so on, are spoken of as research. Strictly speaking, however, experimental work of this character is not research. Biological research, in the true sense of the word, aims at finding out the why and the wherefore; it investigates principles. Later on, when such principles have been established, the scientist can use them as a basis for experimental work, and thus in due course the farmer reaps the benefit. No hard and fast line can however be drawn between research and experiment, and some of the investigations being conducted at Research Institutions are experimental in character—

that is, they aim for example at finding out the results of methods of treatment selected more or less at random, rather than at establishing the principles on which scientific treatment should be based. While this type of enquiry may appeal with greater force to the farmer, it is only rendered possible if there is a sound basis of abstract research. Experimental work aims at getting practical results; research endeavours to find out fundamental principles; and the greatest need at the present time is for the establishment of more principles on which reasoned experiments may be based. This class of work, however, is usually highly technical; it is not easily described in popular language, and it is sometimes remote from practical application."

In the chapter on the soil and its effect on plant growth the author states: "If the peoples of the earth are to live an existence under which the fight for food is not the dominant issue of life—if, in other words, the increase in population is to be accompanied by a corresponding increase in the amount of food obtained from the soil—then, as an essential, we must increase our knowledge of the structure and properties of the soil and of the conditions under which we can secure still higher yields of the fruits of the earth. This, from the standpoint of mankind, is the justification for all agricultural research, or rather, the reason why such research must of necessity be prosecuted. The British farmer cannot be expected, perhaps, to view the matter from quite this broad standpoint; but for him a good and sufficient reason for the conduct of research is that ultimately it will enable him to cultivate his ground to better advantage, to secure an increased output, and hence to hold his own against foreign competitors, and obtain better financial returns for his labour. The old adage, 'knowledge is power,' applies with as much force to agriculture as to any other profession. To the farmer, experience, is undoubtedly an invaluable asset, but agricultural practice, like everything else, changes with changing times, and experience is robbed of half its value unless supplemented by the knowledge which can only be given by research into the hidden mysteries of plant growth."

The following is a summary of some of the chapters in the book: (a) *The Soil and its Effect on Plant Growth.*—This fundamental subject has been entrusted to the Rothamsted Experimental Station, which is concerned, among other things, with the examination of the soil in its relation to bacteria and protozoa, and an account is given of the arduous nature of the research along these lines. The nitrification of organic nitrogen alone has demanded the services of eight research workers, who in many cases have worked night-and-day shifts. An interesting form of investigation undertaken at this station is concerned with the production of artificial farmyard manure. During the later stages of the year, and subsequently, until the agricultural policy of the Government was altered, there was a prospect of a superabundance of straw, more, in fact, than could be dealt with as food and litter by farm animals. The Rothamsted investigators set about devising a means of converting this straw directly into farmyard manure, (1) and the results are most encouraging, although now, with the reduced area of tillage land, the necessity of such conversion is no longer pressing.

At the same station much work has been done on the influence of colloids on the water-content of soil, and on the mechanical operations concerned with tillage. Most ingenious electrical methods are also being exploited to determine the relation between soil acidity and crop production, and the list of publications that have been issued from Rothamsted during 1920 and 1921 shows the extraordinarily varied character of the work being conducted at this famous station. (b) *Plant Breeding.*—The problems that are being investigated along this line are concerned with the baking qualities or strength of English wheat, with the production of cereals possessed of a straw stiff enough to stand up under adverse circumstances, with immunity to disease, with the increase of the number of grains in the ear, with the production of hardier varieties of winter oats, with the relationship of nitrogen in barley grain to the quality of the produce, and with the production of potatoes immune to wart disease. These problems are being dealt with chiefly at Cambridge; while Aberystwyth, the Welsh plant-breeding station, is concerned principally with the discovery of the production of new and improved herbage plants which must be so important in the West of England from the point of view of pasture and meadows. (c) *Plant Physiology.*—The chapter on this subject opens with a suggestive discussion on the fundamental principles involved in crop production. These principles are concerned with the causes that determine heavy cropping and light cropping, resistance to disease, and the formation of flower-buds on fruit-trees. The electrical treatment of crops is also receiving attention at Rothamsted, the Harper Adams Agricultural College, and on a station near Dumfries. To quote from the report, "There is no doubt that electrical discharge will increase plant growth, and it is hoped that it will be found possible to continue the patient experimental work that has been going on for some years, for it seems certain that sooner or later electricity must play an important part on the farm in increasing crop production." (d) *Fruit-growing and Preserving.*—Fruit problems

(1) See article on "Artificial Farmyard Manure" at page 447

are being dealt with mainly at the horticultural station at Long Ashton and at East Malling in Kent. Much suggestive work has been done on the problem of fruit stocks, a subject that has hitherto been very confused and unsatisfactory. The Paradise stock, for instance, has been proved to be a mixture of several varieties, and it would appear that even the crab stock may be graded into several classes, each of which has a distinct influence on the scion that is grafted or budded on to it. This subject is inseparably connected with the development of the root system, a line of research to which the late Mr. Pickering gave much attention, showing that it was quite unnecessary to give the amount of attention that is usually bestowed upon planting. The unexpected result appears to have been confirmed at Long Ashton, the original root system playing practically no further part in the growth of the transplanted tree, which seems to develop a new root system independent of the old. Work on ringing, pruning, disbudding, etc., also promises to have an influence on commercial production, while much light is being thrown upon the problem of manuring of fruit. This station has also contributed largely to our knowledge of the factors that determine the production of high-grade cider and perry. (e) *Plant Diseases.*—In no department of the Ministry's scheme has more activity been shown than in the direction of plant diseases. At the School of Botany in Cambridge special attention has been given to the silver leaf disease, a trouble that is increasing markedly in this country, and is now no longer confined to plums, but has spread to apples and other fruit-trees. How destructive the disease may be is proved by the fact that an apple orchard of about 6 acres, near Wisbech, showed more than 1,000 trees attacked by this disease, the cause being attributed to carelessness in pruning and the neglect to protect the wounds thus caused.

There are chapters on animal husbandry, animal breeding, dairying, animal diseases, and farming as a business, in the discussion of which subject the author states: "The subject which has so far engaged the larger share of attention at the Institute, [1] on account of its prime importance, is cost accounting; in other words, the development of a system of book-keeping which will enable a farmer to ascertain the profit arising from each productive department of his farm, and thus to criticise his own management and to see in what way it could be modified with financial advantage to himself. It is not enough to know approximately what profit is being made on the farm as a whole; this information is, of course, valuable, and many farmers are now having accounts kept on these lines, partly for income tax purposes, and thus have the advantage of knowing how they stand financially at the end of the year. But the result gives no indication as to how any particular branch of farming compares with another branch, and experience of costing shows that the farmer who thinks he can judge of this from experience and from a study of prevailing market prices is often at fault in his conclusions. Certain concrete examples of this, chosen from farms for which accounts were kept by the Oxford Institute, may be quoted. A South-Midland farmer, who was under the impression that he was making money on sheep, found that actually his flocks involved him in a loss of about £600 during the year. This was for the year ending Lady Day, 1921, and therefore before the present severe slump in prices of sheep, and the loss was directly attributable to the heavy wages bill which was incurred in this department of his farm. The farmer has decided to continue sheep farming for another year, and if it still shows a loss he will consider the question of altering his system of farming. In the case of this farm, also, the accounts revealed a possible wastefulness in the old custom of paying wages partly in cash and partly in kind; for it was shown that the bailiff, whose wages in cash were about £150 a year, was actually receiving the equivalent of £400 a year in allowances, thus bringing his total wage to over £11 a week. Another case is that of a Sussex farmer, who was firmly convinced that his profits were derived from his store beasts. The first year's accounts showed that he had lost nearly £200 from these cattle; in the second year, the loss was slightly greater. He therefore decided to alter his policy, and has gone in for dairying, which pays him extremely well. The accounts of this farm also showed that his methods of controlling the feeding of the stock were open to criticism; the rations were admirable, but the stock were actually consuming 30% more than their prescribed rations. This was rectified in the following year, with the result that the margin of waste due to errors in feeding was reduced to five per cent.

"The above examples illustrate the case for cost accounting. It is realized, of course, that farming is a complicated business, and that the farmer has not the freedom of the manufacturer in the direction of closing down unprofitable articles of production; yet a good deal can be done, within certain limits, to develop the system of farming in the direction of the more profitable lines, given a knowledge of the financial results obtained in each productive department of the farm. The farm records and analyzed costs of each important product enable the farmer to judge of the relative financial advantages of various farming processes in a way that neither scientific knowledge nor

[1] Institute for Research in Agricultural Economics.

practical experience can do unaided. He can test the efficiency of various forms of power; he can check the management of horse labour by the record of idle days and their distribution throughout the season; he can check his direction of manual labour by an examination of the percentage cost of labour in any total product-cost when compared with other published results for the same product or with the results of former years on his own farm; he can check the efficiency of feeding and manuring; he can keep control of the issue and use of materials of every kind, feeding stuffs, manures, tools and parts, etc., and thus prevent their careless use and consequent waste; he is provided automatically every year with a cost valuation of all the live and dead stock, tillages, etc., on the farm. Briefly, cost accounts furnish the only reliable means by which a man can satisfy himself that losses in certain departments are not being incurred unsuspected because covered by the profit of other departments, and also the means by which to reduce costs by the better organization of production within departments, so as to turn unprofitable ones into paying enterprises and to make successful ones more successful still. The work published by several institutions on the cost of milk production is known to most people and may therefore be cited by way of illustration. Examination of the analyzed cost in many herds showed a remarkable variation between the best and the worst; in some cases bad results (*i.e.* high costs) were due to low milk yields, in others to expensive feeding, in others to faulty management of labour; but in every case the cause or causes of the poor results were only ascertained when all the costs of production were available for analysis and comparison."

973.—The Meat of Tuberculous Cattle From the Hygienic Standpoint.—Sparaponi, G. C., in the *Annales d'Hygiene* Vol. XXXI, No. 2, pp. 125-131. Bibliography of 44 works. Rome, February, 1921.

The problem of the use of meat from tuberculous cattle in the ordinary way for human food has been much discussed and studied during the last fifty years, but the results obtained have been contradictory and differently interpreted. This is due to the fact that, owing to the lack of accurate methods for determining the presence of latent tubercule bacilli in the meat or organs of tuberculous cattle, there are no data upon which a correct judgment can be based. The author points out that the different results obtained by modern investigators as well as those of former times are attributable to the different anatomical type studied by them.

At the present day, the anatomical forms of tuberculosis which make the meat toxic are well known, but such meat when cooked, becomes innocuous, and according to Nocard and Leclainche, "the consumption of meat which is even raw, or but little cooked, and contains some tubercule bacilli has certainly no bad effect upon man." Further there is no fear of toxic tubercular substances remaining in the cooked meat, since, as Galtier and Edelmann have shown, tuberculous beef contains only negligible quantities of such matters and these are very rapidly eliminated by the organisms of living cattle; this has been demonstrated by Fiorentini and Garino, who thus explain the fact that even serious tubercular lesions may exist where the state of nutrition of the affected animal is excellent.

Rumpel, and many other authors, have shown that the nutritive value of sterilized meat of tuberculous cattle is in no wise inferior to that of the flesh of healthy animals, so that the meat may safely be used for human food, for which purpose it is now very frequently sold in secret. The author therefore advises a radical change in the regulations of the present Italian health legislation dealing with the use of the meat of tuberculous cattle (art. III of the general Health Regulations, February 3, 1901).

CROPS AND CULTIVATION

977.—Weather Forecast and Agriculture.—Gold, E., in *The Scottish Journal of Agriculture* Vol. IV, No. 3, pp. 254-258, 1 fig. Edinburgh, July, 1921.

Forecasts are now made in Great Britain in the following way:—Reports are collected several times a day from different places scattered over a wide area extending from Ireland to Madeira and from Spitzbergen to Cairo; a few reports are also received, almost daily, from some ship in the Atlantic to the West of Ireland.

The data transmitted give information respecting:—The height of the barometer; the way in which the barometer has been changing; the temperature; the direction and speed of the wind; the clearness and humidity of the air; clouds and their height; and a brief description of the weather at the time, and in the interval since the preceding report. By an ingenious utilization of figures, the whole information is telegraphed in 4 groups, each consisting of 5 figures.

The information thus received is entered upon charts or maps. These maps are compared with the maps immediately preceding them and with maps for the same season in previous years, to see what changes followed when the maps had the same characteristic features as those from which the forecasts are being prepared. Data showing the temperature and the direction of winds at great heights are also obtained, one from

aeroplanes, the other by the observation of small free balloons.

In forecasting the following principles are always kept in mind:—

(a) Weather travels, so that a region will usually experience the weather which is travelling towards it.

(b) Hills and mountains modify the weather by forcing the masses of air to rise to greater heights, where they may condense.

(c) Cold surface air tends to displace the layers of warm air beneath it, thus also producing condensation.

(d) Cold air moving over land or sea, where it becomes unduly warmed at the surface is set into vertical circulation, with the production of clouds and showers.

In 9 cases out of 10, it is possible to forecast with reasonable accuracy and confidence for a period of 24 hours ahead.

In addition to the information supplied to the Press, special telegrams are sent to any address on payment of the cost of the telegram and a small registration fee.

In this way regular forecasts are provided, notification of spells of fair weather are issued, and telegrams are sent indicating the progress of meteorological events, and warning when the spell is about to break. Frosts and storms are also notified.

The author makes some remarks on the organization of the Meteorological service abroad, specially in the United States where excellent results have been obtained, and expresses the hope that Great Britain will follow the good example set in America. He strongly advises the use of signals hoisted in some prominent position to announce the approach of frosts or of severe gales, or the setting in of fair weather.

885.—**Influence of Periods of Drought on the Growth of Plants.**—PFEIFFER, T., RIPPEL, A., and C. PFOTENHAUER, in *Die landwirtschaftlichen Versuchs-Stationen*, Vol. XCVI, Parts V and VI, pp. 353-363. Berlin, 1920.

Hellriegel, Wollny, Pfeiffer, with Blanck and Flugel, have already noted that intercalated waterings, when water is lacking, are harmful to the growth of plants, and even a large quantity of water after a period of drought is not sufficient to repair the injury which the plant has suffered so that, especially for spring crops, an average frequency of watering is much more suitable.

E. Gain has observed, however, that a certain quantity of water applied after a slight drought gives better results than permanent moisture even when optimum; the extreme case of injury caused by permanent moisture and a distinct advantage from interrupted waterings even occurred with the thorn-apple.

The authors have therefore considered it desirable to take up the question again by making pot experiments with lupins and spurrey as xerophilous plants, and with barley and oats as hydrophilous plants; these two last crops were, however, attacked by *Erisiphe graminis*. One series was kept at a constant humidity (60% of the capacity of water) by replacing every day the water evaporated; the other was left in suspense up to a certain degree of humidity (30% of the capacity of water), then a quantity of water equal to that which had been applied in the meantime to the first series in several waterings was applied during 26 periods. The yields in dry matter obtained were as follows:—

	Constant humidity	Alternate drought
	gm.	gm.
Lupins	35·0	24·5
Spurrey	28·1	21·1
Barley	14·6	14·4
Oats	32·4	28·0

The deductions from these results and from other observations is that, at least for the plants in the experiment, the greatest possible constant water content of the soil gives better results, or, at worst, not inferior results to those which are obtained by using the same quantity of water intermittently. A temporary dryness of the soil, not exceeding a certain limit, causes injury of various degrees to the growth of all plants, and the reason is found in their different aptitudes for adaptation to drought relatively to their greater or less power of reducing the consumption of water; spurrey and lupin, for example, require a long time to reduce the humidity of the soil from 60 to 30% of the capacity of water, and in the light of the experimental method adapted, these plants suffer more injury if they remain exposed for a long time to drought; barley comes next and lastly oats which make the greatest demands on the moisture in the soil.

The consumption of water per gram of dry matter produced is less with alternate periods of drought, and this is all the more noticeable with plants which adapt themselves better to the conditions of humidity of the moment, by regulating evaporation.

886.—**The Carbon Dioxide of the Soil Air.**—TURPIN, H. W., in *Cornell University Agricultural Experiment Station, Memoir 32*, pp. 319-362. Ithaca, N.Y., April 1920.

Carbonic acid has long been recognized as an important soil solvent, but from the data available, it is not yet clear what are the chief factors controlling the production of carbon dioxide in the soil; although it is

generally considered that a large proportion is due to the action of micro-organisms, the part played by plant-root excretions in this connection has not been determined. With a view to deciding this question, the author carried out a series of pot (the plants being grown in iron cylinders) and greenhouse experiments, a special arrangement for estimating the carbon dioxide being employed. The soil was a heavy clay loam rich in silt, and brought up to 30% moisture content on the oven-dry basis.

It was found by these experiments, that oats increased the production of carbon dioxide in the soil. This increase became marked after the first month from the time of sowing, and increased to a maximum just before or after the plants headed; then there was a gradual decline. Millet (*Setaria italica*), behaved in much the same manner, but the production of carbon dioxide by each plant was approximately half as great, and the most marked rise in the carbon-dioxide content of the soil occurred at a later period of growth than in the case of the oats. The cropped soil, after harvest, maintained a higher percentage of carbon-dioxide than was found in the uncropped soil. This was probably due to the decomposition of the plant roots left in the ground. The correlation existing between carbon-dioxide production and transpiration would seem to confirm the theory that increased plant growth is accompanied by more intense formation of carbon-dioxide. Fluctuations in the amount present in the uncropped soil were accompanied by similar fluctuations in cropped soil only after the removal of the crop and before the plants had made much growth. There appeared to be no definite connection between the soil temperature at the time of sampling and the carbon dioxide in the cultivated soil, or that assumed to be produced by the crop (determined by subtracting the carbon-dioxide in the bare soil from that in the cropped soil). In fact, the carbon-dioxide content of the former was usually high during warm weather, and low when the temperature decreased; further, very low atmospheric pressures were usually accompanied by an increase in the amount of carbon-dioxide in the uncultivated soil.

The carbon-dioxide produced presumably by the plants appeared to be independent of the initial carbon-dioxide content of the soil, which would seem to indicate that plants and soil organisms act independently in the production of this substance.

In conclusion: it may be assumed, that the plant itself and the micro-organisms present in the soil produce most of the carbon-dioxide. At the period of its most active growth, the plant produces much more carbon-dioxide than the soil organisms, and the excess carbonic acid in cropped soil is due to the respiratory activity of the plants rather than to the decay of root particles, from the crop growing on the soil at the time of analysis.

983.—**Analysis of Soils.**—VESTERBERG, K.A. SVENSK KEM. (Tidskr. 1921, 33, 12-22) in *Journal of the Society of Chemical Industry*, Vol. XL, No. 11, p. 401-A. London, June 15, 1921.

The author questions statements to the effect that salts dissolved in the moisture in soils are absorbed by plants at the same ratio as the water itself; the roots do not take up the salts, etc., in the proportion in which they occur in the soil.

As regards the concentration of plant foods in soil moisture, which constitutes the minimum requirement of plants, the following quantities are suggested:

Phosphorous pentoxide, 1-2 mgm. per litre; nitrogen, 2-5 mgm. per litre; potassium, 10-20 mgm. per litre.

Climate would possibly have some effect on the efficiency of these amounts of foods.

Artificial Farmyard Manure.—HUTCHINSON, H. B., and RICHARDS, E. H., in *Journal of the Ministry of Agriculture*, Vol. 28, No. 5, pp. 398-411. London, August, 1921.

Experiments conducted at the Rothamsted Experimental Station to investigate the possibility of converting straw into manure without the intervention of live stock are reported.

From these experiments a method was devised by which straw can be converted into a substance having many of the properties of stable manure. In a considerable number of preliminary experiments to secure obvious breakdown and colour changes in fermenting straw, the most promising results were obtained when the straw was subjected to the action of a culture of aerobic cellulose-decomposing organisms (*Spirochaeta cytophaga*). Further inquiry developed that this effect was due mainly to the indirect effect of the mineral substances contained in the culture fluid.

It was found that the most essential factors making for the production of well rotted artificial barnyard manure are air supply, suitable temperature, and a suitable supply of soluble nitrogen compounds. It was established that characteristic breakdown changes in straw remain suspended when a free supply of air is excluded either by intense consolidation or by immersion of straw in liquid. The fermentation appeared, therefore, to be an essentially aerobic one, at least in its early stages, and the typical disintegration of the straw with the production of dark coloured plastic material did not take place in the absence of air. Also, the colour of aerobically produced manure was rapidly reduced when oxygen was excluded.

Repeated experiments showed that the most rapid breakdown of straw occurred when some source of available or indirectly available nitrogen was supplied, and then only in those cases where the reaction of the solution was neutral or slightly alkaline. Neither ammonium sulphate nor caustic soda were effective in this respect, since with the former the medium soon became markedly acid and with the latter the nitrogen was lacking. The addition of nitrogen in the form of urea, urine, ammonium carbonate, or peptone within certain concentrations immediately caused rapid decomposition changes, resulting in the production of dark coloured, well disintegrated, structureless material closely resembling well rotted manure.

It was brought out that it is of no less importance that the quantity of nitrogen added should not exceed a definite amount either actually or in concentration. If the concentration of ammonium carbonate produced from the decomposition of urine or urea exceeded a definite limit, straw breakdown changes were not only definitely held up but continued to be inoperative until by volatilization the concentration or alkalinity was reduced to the upper limit of growth of the micro-organisms. This is regarded as particularly important since the highest concentration for rapid breakdown was found to be appreciably below that of the weakest undiluted urine. In this connection it was found impossible to produce well rotted manure by the use of neat urine without considerable losses. Further experiments showed that, in addition to the two phases in which straw overloaded with nitrogen loses it to a definite degree and in which straw with the requisite amount of nitrogen may undergo rotting without appreciable loss, there exists a third phase in which undersaturated straw, by the agency of micro-organisms, exhibits a well marked property of picking up nitrogen, particularly in the form of ammonia, until the same final content of nitrogen in the rotted product is attained. It is therefore concluded that in two different but adjacent portions of fermenting straw, the one overloaded with and the other lacking nitrogen, the former portion loses and the latter accumulates nitrogen until a common level is approached.

In general it was found that when straw has worked from an unsaturated to a stable phase, little or no free ammonia is to be found, but that straw which commences with an excess of nitrogen appears to hold, when in a fermented state, upwards of 14 per cent of its nitrogen in the form of ammonia so long as the material is in a moist condition. Desiccation led to almost complete loss of ammonia.

It is concluded that the amount of nitrogen necessary for pronounced rotting and the amount which straw is capable of fixing in the form of ammonia are identical, and that, in general the figure varies only between 0·7 and 0·75 parts of nitrogen per 100 parts of dry straw.

The experiments further showed that urea and ammonium carbonate are the most suitable carriers of nitrogen for this purpose, but owing to their cost alternative sources of nitrogen in the form of cyanamid and ammonium sulphate have been used with success. The latter, however, must be used with lime.

The Effect of Straw on the Biological Soil Processes.—MURRAY, T. J., in *Soil Science* Vol. 12, No. 3, pp. 233-259. Baltimore, March, 1921.

Studies conducted at the Washington Experiment Station to determine why the addition of straw to the soil causes a decrease in the subsequent crop yield are reported.

The addition of straw to the soil had a harmful effect on nitrate accumulation after a given time, which increased as the amount of straw increased. Total nitrogen determinations made throughout the work showed that where there was a loss in nitrate nitrogen it was transformed to some other form of nitrogen, and was not lost to the soil. As the amount of straw increased the loss of nitrates already in the soil increased. Straw acted as a source of energy for nitrogen-fixing bacteria, although the amount of nitrogen fixed was not dependent upon the amount of straw.

Ammonification was inhibited when the amount of straw present exceeded 0·9 per cent, and the harmful effect increased as the amount of straw increased. Straw had no effect on the kind of bacteria present in the soil. Cellulose from either filter paper or straw had no effect on the nitrate-forming bacteria.

The conclusion is drawn that straw applied to soil stimulates the reproduction of bacteria, and that the bacteria use the straw as a source of carbon and the soil nitrates as a source of nitrogen. The nitrates are transformed to organic nitrogenous material and are temporarily lost as available plant food, the intensity of the reaction apparently depending upon the amount of straw.

985.—The Influence of Fertilizers Upon the Productivity of the Soil.—JORDAN, W. H., Soil studies. I. The Influence of Fertilizers Upon the Productiveness of Several Types of Soil. II. The Influence of Fertilizers and Plant Growth Upon Soil Solubles, in *New York Agricultural Experiment Station*, Bulletin 473, 27 pp. Geneva, N.Y. March, 1920.

It was found, by growing barley under forcing-house conditions, on 9 different

types of soil consisting for the greater part of loams, the vegetative growth was influenced very little by the application of either litter or leaf-mould. During the first year's experiments, well-composted farm manure did not produce additional growth, although the results obtained with it the second year were satisfactory, but the plants to which commercial fertilizers were applied grew much more than those receiving stable manure, the quantities of nitrogen, phosphoric acid and potash being the same in the two cases. Slaked lime applied with farm manure had a very irregular effect according to the different types of soil, in short, nitrogen appeared to be the sole fertilizing substance having a marked influence upon barley.

To confirm these results, two soils were selected, one highly productive, and the other less fertile, and barley again planted. It was found that, under forcing-house conditions, the soils appeared to supply sufficient quantities of phosphorus and potassium for luxuriant vegetation.

The application to the soil of soluble compounds of nitrogen, phosphorus and potassium, materially increased the proportion of water solubles in the soil; these were used by the plants, and their amount was thus rapidly reduced before the barley had attained considerable growth. In the latter stages of its development, the quantity of the water-solubles remained constant and was much the same (with the exception of the phosphorus) as that present in the soil receiving no fertilizer.

To sum up: it would seem that from the practical standpoint, the above data show the importance of the solubility of the three essential ingredients of fertilizers, especially in the production of quickly growing crops. Plants accumulate a large proportion of the required nitrogen and ash ingredients during the early stages of growth, for which reason, in the case of forcing-house culture, vegetable-gardening, and of such crops as cabbages, potatoes and wheat, an adequate supply of immediately available food appears to be indispensable in order to obtain good results.

891.—The Mechanism of the Decomposition of Cyanamide in the Soil.—COWIE, G. A., in *The Journal of Agricultural Science*, Vol. X, Pt. 2, pp. 163-176. Bibliography of ten works. Cambridge May, 1920.

In a preceding investigation the author showed that cyanamide readily breaks down, yielding ammonia in normal clay and sandy soils. The experiments here discussed confirm the view held by Ulpiani as a result of his later work, namely that cyanamide breaks down by a purely chemical change to urea which is then converted into ammonia.

In the experiments carried out by Ulpiani, culture solutions of various concentrations and at various temperatures were employed, whereas the author conducted his experiments in soil under natural conditions, using amounts of cyanamide comparable with those used in practice. No appreciable amount of ammonia as a result of the decomposition of cyanamide in sterile soils was evident (heated to 120° or 135°C.). The addition of the urease of soya-bean, however, produced considerable quantities of ammonia in these soils which indicated the presence of urea, later confirmed in the laboratory. Further experiments demonstrated that urea actually remains stable in soils heated to 120°C. The addition of cyanamide to sterile soils thus leads to an accumulation of urea, which persists as such in consequence of the suppression of the necessary urea decomposing organisms. Similarly the addition of cyanamide to soils heated to 100°C. does not lead to immediate production of ammonia but yields urea, which decomposes after the recovery of the appropriate organisms. There is on the other hand, evidence of a rapid and progressive production of ammonia arising from the decomposition of cyanamide in unheated normal clay and sandy soils. However, examination of these soils revealed in the initial periods the presence of appreciable amounts of urea.

The cumulative evidence thus leads to the conclusion that cyanamide in the soil is normally converted by a purely chemical process into urea and independently of the activity of micro-organisms. The urea is then broken down into ammonia by means of soil organisms. Cyanamide appears to behave in this way in both clay and sandy soils, but the decomposition seems to be more rapid in the former case. The experiments have conclusively shown that cyanamide does not decompose into urea in ordinary impure quartz sand; whatever the decomposing agent may be it is not present in pure sand. In one special case sand has been shown to contain a constituent resembling a zeolite. In any case cyanamide does not appear to decompose in the manner above indicated in peat and fen soils; in these it gives rise to a relatively small production of urea under normal conditions.

996.—Potato Improvement by Hill Selection in U.S.A.—STEWART, G., in *Utah Agricultural College Experiment Station, Bulletin* No. 176, pp. 3-28, figs. 14. Logan, Utah, Nov. 1920.

In 1911, a number of the highest and also of the lowest yielding hills were selected and isolated from the Majestic, Bangor and Peerless varieties, then being grown at the Utah Experiment Station. In 1912, the tubers from each hill were cut into sets weighing approximately 2 or 3 oz. and

containing on the average 2 eyes. The sets were planted about 15 in. apart with rows 3 ft. apart. At harvest time each hill was dug separately and the tubers isolated and later weighed, etc. About half of the best hills from the best progeny-rows and a few high yielding hills from other good rows were chosen. In poor selections, the lowest-yielding hills were used for seed. This method of selection was continued from 1912 to 1919, and is being continued still further and supplemented. Except that the poor selections were discarded in 1916, and after 1914, Bangor and Peerless stocks were also discarded on account of inferiority in yield.

The experiment was so conducted as to avoid selection for somatic characters and to secure selections for gametic qualities. This was done by growing all the best strains for 2 or more years in order to get a progeny test of the power of a strain to transmit its desirable qualities to the succeeding generations.

By 1915 the high yielding strains yielded an average of 301·03 bus. per acre as compared with 179·30 bus. per acre for unselected. From 1915 to 1920 the selected strains had outdistanced the unselected stock of the same variety by more than 100 bus. per acre, except for 1919 where there was a difference of only 29·6 bus.; (this wide fluctuation may have been due to the extremely unfavourable growing season of 1919). In 1920, however, the superiority of the selected strains manifested itself, out-yielding the unselected strains by 168·6 bus.

Taking the 6-year average 1915-1920, the acre yield of the selected strain was 60·9% greater than that of the unselected, and the average size of tuber 24·4% greater.

The germination of the selected strain is more rapid, the stand is better, the growth thriftier, and diseases less apparent than for the unselected potatoes of the same variety.

A degenerate strain of highly chlorotic foliage has been isolated, but this could not be traced to any disease.

905.—Treatment of Potato Sets and Arguments for and against Cutting and Planting Whole.—I. Cooley, E. W., To Cut or Not to Cut Seed Potatoes, in *The Potato Magazine*, Vol. 3, No. 11, pp. 8-9, Mount Morris, Illinois, May, 1921.—Schribaux, E., Experiences a entreprendre sur la fragmentation des plants de pomme de terre, in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. 7, No. 4. Paris, Jan. 26, 1921.—III. Taylor, W. H., Treatment of Potato Sets in New Zealand in *The New Zealand Journal of Agriculture*, Vol. XXII, No. 4, pp. 227-228. Wellington. April 20, 1921.—IV. Tice, C., The Potato in British Columbia Whole versus Cut Seed in *Department of Agriculture, Soils and Crops Division, Province of British Columbia*, Bulletin No. 86, pp. 24-27. Victoria, B.C., 1921.

Some growers declare that seed potatoes should be cut lengthways so that each piece will contain a part of the seed end of the potato, confident in the fact that the seed end sprouts sooner than the stem end or any other part of the potato and that the sprouts will be stronger and the yield larger. Others assert that the seed end should be cut off and thrown away as they consider that instead of sending out one or more strong vigorous shoots, the seed end will produce a number of small, weak ones. Then again, some of the most successful potato growers plant nothing but the whole potatoes. Experiments made in various countries are therefore well worth consideration in order to come to some more definite conclusion as to the best method to adopt.

I.—In the United States as a result of observation and experiments conducted in Maryland, Michigan, Colorado, etc., it was concluded that most of the eyes on a potato have equal value for seed purposes, and at Michigan Agricultural College Farm it was demonstrated that the stem end piece bore as vigorous sprouts when separated from the seed ends as the seed ends themselves, and when all other conditions were equal, the individual hill yields were also approximately the same. While it is true that the size of the seed piece is more important than the number of eyes, the experiments seemed to indicate that each seed piece should contain at least two eyes.

A number of seed potatoes from high yielding hills were cut so as to give pieces of approximately the same weight but with varying numbers of eyes. Twenty-one pieces containing 1 eye per piece showed 61% germination; 4 pieces with 1½ eyes per piece showed 75%; 20 pieces with 2 eyes per piece, 4 with 2½ eyes per piece and 7 with 3 eyes per piece, showed 100% germination. The average quantity of cut potatoes used amounted to 10 bushels per acre, but experiments conducted on 360 farms in the State of New York showed that the yield was from 85 to 100 bushels more per acre when 18 bushels of seed were planted than when 10 bushels were used.

II.—M. Scribaux draws attention to the evident disadvantages connected with cutting sets, and then proceeds to indicate the advisable methods to adopt in order to compare the growth and yield to be obtained from cutting or planting whole, in consideration of the fact that at the Academie d'Agriculture d'Angers, information has been received recommending the cutting method

both from the economical standpoint and as regards yield.

As regards the disadvantages, emphasis is laid on the fact that certain varieties (e.g. Richters' Imperator) when cut, are liable to rot. This is, however, an exception, and there is no reason to exaggerate the physiological dangers attached to cutting which can to a large extent be lessened and even eliminated. Care should be taken to plant only sets which have been exposed to the air for several days. Secondly, extra labour is involved in the cutting process. There is also a risk of waste through drying which applies also to the period following planting, as cut sets are less resistant to drought, defective cultural operations, etc., than whole sets. Even under favourable conditions, success is at present uncertain and the author considers that this is due to the lack of knowledge concerning (a) the advisable average weight of the cut sets; (b) the best system of planting to employ.

The author suggests the following plan but considers that unless the greatest care is taken to observe the details, it should not be attempted, seeing that it is the relative and not the absolute yield which it is desired to determine.

Whole sets		Cut sets					
		Small About 0·35 oz. Each with 2 eyes		Medium About 0·7 oz.		Large About 1 oz.	
Distance apart	Number of plants per square yard	Distance apart	Number of plants per square yard	Distance apart	Number of plants per square yard	Distance apart	Number of plants per square yard
inches		inches		inches		inches	
20 x 16	5	20 x 6	14	20 x 8	10	20 x 10	8
20 x 20	4	20 x 7	12	20 x 12	7	20 x 13	6
20 x 24	3	20 x 10	8	20 x 16	5	20 x 20	4

The cutting of small sets above recommended is the method adopted with success by M. Maisonneuve at Angers, who after having removed a third of the tuber where there are few eyes, cuts the remainder into 6 or 8 parts according to the number of the eyes. As regards the large sets M. Schribaux recommends a similar removal of the lower inferior part of the tuber and cutting vertically the remainder into equal parts.

With reference to planting, the author remarks that the cut sets should be planted less deeply than the whole sets; about 1·2 to 1·6 inches deep for the small, 1·6 to 2 inches for the medium, and 2 to 2·4 inches for the large.

At harvest time, note should be made of the failures, the average number of shoots per plant, the yield per plot and per clump, the average weight of tuber and the proportion of large, medium and small. During these experiments, it is particularly important to note carefully all circumstances which tend to influence the quality of the yield in one way or another.

III.—In New Zealand it has been proved by growers that potatoes may be roughly divided into two classes, viz., round varieties on which the eyes are nearly all active at the same time, and kidney shaped (occasional rounds) that have a decided rounded end. If the former be planted with all the buds intact, a large proportion of them will grow into shoots. The latter behave differently. One, two or three buds start before the others, and if nothing happens to destroy them they will produce a plant. The remaining eyes will remain dormant. If the tops of these shoots are injured by frost, they make fresh growth lower down. This naturally results in a reduction in the crop, but the latter may still be profitable. A second frost may occur which will entirely destroy the first tops. Other buds, that probably have already broken but not made much headway, then break through and may produce a crop just sufficient to pay costs. This explains why no disbudding is done. The seed tubers are not cut as that would cause delay, and the second set of buds would not be able to continue growth.

The common belief that all the eyes on a set will produce shoots, and that disbudding is necessary to prevent an overplus of shoots which would give small potatoes is, therefore, contradicted.

IV.—Experiments conducted in British Columbia support the claim made by M. Scribaux that in districts where the land is wet or poorly drained, whole potatoes are preferable to cut sets, since the latter rot easily. Also cut sets are more subject to disease, and sprout later. However, the percentage of marketable potatoes has been found in this case to be smaller when whole sets are planted than with cut sets.

When cut sets are used, a 2-oz. piece has been usually found the best. This statement is fully borne out in an experiment carried out by Dr. Zavitz at Guelph. Sets were

planted for 5 years weighing 1-16 oz., 1-8 oz., ¼ oz., 1 oz., and 2 oz.; one eye was left in a piece and the pieces planted 1 ft. apart in the rows. There was a variation in yield from 47·5 bushels to 173·9 bushels for 2 oz. of seed. Subtracting the amount of seed used, the former gave 46·2 bushels and the latter 132·7 bushels. The system of cutting out the eyes of the set is not recommended as the author considers there is not enough plant food present to support the young shoot till it develops a root. The system of two eyes to a set is usually conceded as giving better results than even 1 or 3 eyes. Where a large number of eyes are present the percentage of marketable tubers is greatly reduced; this was found especially true when the seed-end of the potato was planted although the potatoes thus obtained were earlier.

LIVE STOCK AND BREEDING

931.—Correlation Between the Size and the Digestibility of a Ration.—HONCAMP, F., and KOCH, E., in *Die Landwirtschaftlichen Versuchsationen*, Vol. 96, Nos. 1 and 2, pp. 45-120. Berlin, March, 1920.

Henneberg, Stohmann and Wolff had already doubted the existence of any important influence exerted by the size of a hay ration upon the digestibility coefficient. Kellner, on the other hand, having fed a mixture of roughage and concentrates to oxen, observed that the digestibility of the ration decreased as the quantity increased.

Experiments carried out in America, by Jordan and Hall on cows and sheep, gave contradictory results, whereas Katayama and also Schneidewand observed that pigs digested best the protein contained in the smallest ration.

As the results hitherto obtained were at variance, on June 1, 1914, the authors began a series of experiments on sheep, to determine the possible correlation existing between the size and digestibility of a ration, when the fodder was the same, both in the case of a ration composed wholly of bulky fodder, and in that of one containing roughage as well as concentrates.

In the first series of experiments, which was divided into 4 experimental periods of 10 days separated by intervals of 8 days, 3 sheep were fed a daily ration of 600, 900, 1,200 and 600 gm. respectively, of the same clover hay: the author obtained for the 2 animals and the different sized rations, average variations not exceeding the usual limit of experimental error, except in the case of crude cellulose, of which the digestibility coefficient in the largest ration was 6·6% lower than that of the smallest.

In a second series of experiments carried out under the same conditions as the preceding, but with a ration composed of clover-hay, gluten, soya-flour, potato-slices mixed with molasses and potato-flakes the digestibility coefficient of the largest ration differed from that of the smallest in the following degrees:—2·7% total organic matter; 2·2% protein; 1·7% nitrogen-free extract; 6·5% pentosan; 7·6% crude fibre; and + 8·6% ether extract (crude fats), the only positive difference.

In another series of experiments with 2 young sheep, the rations fed consisted of clover hay, dry potatoes, rice and gluten, and only differed from the preceding ration in containing a larger proportion of carbohydrates, especially of the soluble varieties. With this ration, the reduction of digestibility was greater than in the second series of experiments.

The authors do not think that the variations in the digestibility of the albumen can depend upon the differences in the intensity of intestinal decomposition, seeing that, in the experiment, the difference between ingested and evacuated matter was allowed for. Nevertheless, they have carefully observed the organic exchanges of nitrogen and sulphur under their various forms, taking as a basis the view of Abderhalden. According to the latter, it would seem probale that under normal conditions all the esters combined with the sulphuric acid of the urine (phenol, indoxyl, skatoyxl) are derived from intestinal putrefaction, an opinion that is not shared by Emden, Glaessner and Folin.

The authors conclude by stating that: (1) In the main, their researches on the secretion and decomposition of the sulphur compounds present in the urine of the herbivora have not given the desired and expected results; (2) the results of these researches in no wise warrant the assumption that there is any correlation between the small depression of the albumen resulting from the increase in the ration, and a diminution of the decomposition of albuminoids in the intestine; (3) if the quantity of sulphuric esters in the urine were alone taken into consideration, an increase, rather than a decrease, in the decomposition would be observed as a result of the larger ration.

In fact, the increase in the ration produces a decrease in the solubility and digestibility of the crude fibre in the intestine, partly on account of the short time the unit weight of the food mass remains in the intestine (which also has the greatest effect when the ration consists exclusively of roughage), and partly because, if a ration is composed of a mixture with a high content of easily-soluble carbohydrates, the latter are first attacked by the bacteria of the intestine, and are rendered soluble and digestible, whereas the fibre is not touched; this depresses the digestibility of the crude cellulose forming the cell wall and hence of that of

the albumen of the carbohydrate substances, etc., present within the wall.

In other experiments made upon 4 young sheep fed with a mixture of ordinary fodder in proportions varying in such a manner as to give rations differing as regards the amount of Kellner's starch equivalents, the protein alone showed any practical difference in digestibility in the ration containing least starch equivalent.

The authors conclude that although it is true that an increase in a ration reduces its digestibility, yet it does so to such a slight extent as to be negligible in comparison with the larger errors made in calculating rations based on the mean value of the composition and digestibility of the fodders given.

AGRICULTURAL INDUSTRIES

952.—Nitrogen and Other Losses During the Ensiling of Maize.—SHAW, R. H., WRIGHT, P.A., and DEYSHER, E. F., in *United States Department of Agriculture Bulletin No. 953*, pp. 1-16, bibliography of 19 works. Washington, D.C., May 14, 1921.

For several years the Dairy Division of the United States Department of Agriculture has been studying to find out more definitely what losses incident to the ensiling of maize are necessary, and what is the proper method of handling the crop to prevent such losses. This bulletin deals with the losses of nitrogen and other elements in maize silage made under ordinary farm conditions.

A cylindrical concrete silo was employed 42 ft. high x 14 ft. inside diameter, holding approximately 150 tons, and located at the Dairy Division Experiment Farm, Beltsville, Md. The floor was 4 ft. below the lowest door and the silo up to this door was water tight. The experimental work was carried on for 2 seasons, 1914-15, 1915-16. The depth of the silage after settling was approximately 38 ft.

The weight and chemical composition were recorded of: (1) the maize in each sack as it was buried; (2) the contents of the sacks as they were moved from the silo; (3) the juice. The losses or gains in each sack were estimated, based on the weights ensiled.

The results of the chemical analyses as given in the Tables, show many evidences of a down-wash of soluble material, the upper part of the silo losing and the lower part gaining. The greatest loss of dry matter in any bag in 1914-15 was only 18·64%, while the average loss for all the bags was 8·66%. The bags in the upper and lower halves of the silo showed respectively, 12·74% and 4·70% losses in dry matter. The apparent reversal of results in the following season may be attributed to the much larger outflow of juice. The average loss for all bags, however, from the 2 years' work, may be taken as nearly 10% of the dry matter, which is probably due to a large extent to the fermentation of the carbohydrates and to the carrying away of a soluble material by the juice. The reducing and non-reducing sugars almost entirely disappeared. There was a considerable loss in crude fibre and in the furfurol yielding bodies.

The evident loss in total nitrogen may be due largely, if not entirely, to the nitrogenous compounds which escaped in the juice. The albuminoid nitrogen suffered a loss of over 50%, while the non-albuminoid forms increased several times their own weight.

If the total nitrogen of the 2,579 lb. of juice collected in the first season is expressed as pure protein, the loss was 28·89 lbs. which represents the protein in about 1,500 lb. of average silage. In the second season, the results expressed in a similar way, show a loss of 150·75 lbs. in the 9,494·5 lb. of juice collected, representing the protein in about 7,500 lb. of average silage.

There was a gain in ether extract, which is probably due to the formation of new ether-soluble bodies.

The juice which was collected the second season amounted to nearly 10,000 lb. This juice averaged 0·263% total nitrogen, 0·0283% albuminoid nitrogen, 317·9 parts ammonia nitrogen and 1,472·9 parts amino-nitrogen per million.

1047.—Utilization of the Potato as Stock Feed, Source of Alcohol, etc., Manufacture of Dehydrated and Dried Pressed Potatoes, Flour and Starch.—GORE, H. C., in *State of New Jersey, Department of Agriculture*, Bulletin No. 28. Trenton, N.J., March, 1921.

The necessity of providing some outlet for surplus potatoes during exceptionally favourable seasons, has led to the utilization of potatoes for various purposes. The author here reports the progress made in the United States in this respect:—

Stock Feed.—One of the difficulties of profitable feeding of potatoes is the necessity of providing an adequate supply of sound stock throughout a long period. It now seems probable, however, that this difficulty can be overcome by the practice of ensiling; potato silage is eaten freely by cattle and can be used also for pigs; it appears to be as palatable as the best maize silage.

An experiment was made at the Dairy Farm at Beltsville comparing the gain in weight of 6 cows, 3 fed with potato silage and 3 with maize silage for 30 days, at the end of which time the rations were reversed, allowing 10 days to make the changes and extending the length of the experiment another 30 days. The following table shows the milk and fat produced, feed consumed and the gains in weight.

Manufacture of Dehydrated Potatoes.—There is at present no wide market for dehydrated potatoes (dried) although during the war the use was considerable.

Manufacture of Dried Pressed Potatoes.—The equipment needed for converting the potatoes into dry feed is easily constructed; the washing is done in a continuous paddle machine of the type used in washing potatoes for starch making. From the washer the potatoes are ground until liquified and passed into a stock box, provided with a gate valve, and then passed into the hydraulic press as needed. About one ton of ground potato is pressed at one time, the process taking from 15 to 20 minutes. The yield of dried pressed potato is about 20% of the weight of potatoes.

	Produce		Feed consumed				Gain in weight
	Milk	Fat	Grain	Hay	Potato	Maize silage	
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Maize silage groups—							
First 30 days	1,719·3	79·95	780	540	.....	2,700	60
Second 30 days	1,611·5	83·62	810	540	.....	3,000	78
Total	3,330·8	163·57	1,590	1,080	.....	5,700	138
Potato silage groups—							
First 30 days	1,546·0	77·64	808	540	3,000	.....	86
Second 30 days	1,732·2	80·09	780	540	2,700	.....	71
Total	3,269·2	157·73	1,588	1,080	5,700	.....	157

Manufacture of Alcohol.—This work carried on under the direction of Wiley (Bureau of Chemistry, U.S.), started in 1910, permits the following estimates to be made as to the cost of alcohol manufacture in small plants: Approximately 0·66 gall. of 180 proof alcohol can be produced from 1 bushel of potatoes of 14% starch content. The potatoes used daily will weigh about 8,000 lbs. to obtain 100 gall. per day; and this necessitates the mashing of 320 lbs. of malt.

A summary of the cost per gall. of alcohol (180 proof) is given as follows (in dollars): Raw material 0·279, investment 0·124, operating 0·159. Total $0·562.

There will be about 1,000 gall. of spent mash worth $0·04 per bus. of original potatoes, or $5·33 or 0·053 per gall. of alcohol produced; this makes on an average the net cost per gall. $0·509.

This may be compared with the cost of manufacturing alcohol from potatoes in a plant of German manufacture, in which alcohol of 180 proof is produced at the rate of 263 gall. per day, and the total cost amounts to $0·478 (i.e. the net cost per gall. $0·425).

Owing to present conditions these figures would now be considerably increased, and whether or not the production cost can be decreased still remains an open question for further experimentation.

Potato flour.—The most important process developed is a steam drying method in which the potatoes are converted into potato flakes which are later milled into flour.

The raw potatoes are washed in a machine commonly used in distilleries or starch factories and then conveyed by an elevator to a steamer erected over the drying apparatus, where they are cooked by means of low pressure steam. After steaming, the potatoes are allowed to fall by gravity into hoppers and through the emasculators, where they are reduced to pulp, and in this shape are forced on to the drying drum. These drums turn in opposite directions at 5 revolutions per minute. The heat dries off the moisture of the pulp and leaves a firm mass that is scraped off by means of knives set parallel to the main axes of the drums. The dried mass falls into a spiral transformer fitted with revolving arms where it is broken into flakes and conveyed to the packing room. Numerous factories are now established in various American States, and the capacity of a single unit plant is about 8,000 lb. per day. The flour is used principally to improve the quality of bread, but has other baking uses. There is, however, still much to be done in developing this industry. The price at present is about 9 cents per lb. in wholesale quantities. The author considers that this flour does not possess the same glutinous qualities as rye and wheat flour, but has peculiar properties as yeast food and a good flavour.

Potato starch.—This is more extensively manufactured than any other potato product. All grades of potatoes have been found to yield starch of good quality. The author describes the methods employed in the American factories including the processes of washing, grinding, sieving, settling and washing the starch, the treatment of "brown starch" (soft layer of sticky brownish sludge 2 to 6 inches in thickness, consisting of fine particles of cell-wall tissue from the

potatoes and other impurities and a certain quantity of starch), and finally, the drying and bagging. The average capacity of the starch factory with its dryer is 4 tons of dry starch per day.

The author considers the "Jones" factory at Caribon, Maine, as an example of the best type of the more modern Maine potato starch factories. It differs from the earlier types in the arrangement and operation of the settling and washing tanks.

As regards the value of potato starch compared with other starches, the author states that it is more valuable than maize and cassava starch, but somewhat inferior to wheat starch. The actual starch content amounts on an average to 15%.

It has, however, value in the finishing and weaving of textiles which no other product possesses, especially fine grade cotton goods. It is also the source of the best grade of white dextrin used in making finer grades of library paste.

1050.—Pasteurization of Milk in Bottles and Jars.—KUFFERATH, H., in the *Annales de Gembloux*, Year XXVII, Part 6, pp. 196-202. Brussels, June, 1921.

In the course of tests carried out at the Intercommunal Laboratory at Brussels for the purpose of controlling the milk supplied by the Intercommunal Dairies, it was found quite impossible to pasteurize milk completely with the usual type of continual pasteurizers (the "holding process"), under normal industrial conditions, and further that from the hygienic standpoint, the results obtained were disastrous. Thus, from 1915 to 1918, 22 samples out of 29 examined were declared to be bad, and not to answer to the description of pasteurized milk; only 4 samples were good, and 3 were fair. On an average these milks contained 349,379 bacteria per cc. and in 10 cases (or 34·4%), coli bacilli were discovered. Until the end of 1919, out of 7 samples of pasteurized milk 1 would be found satisfactory and 6 unsatisfactory; 4 times coli bacilli were present, and the average number of micro-organisms was 910,693.

On testing the milk on the market, this was also proved to be insufficiently pasteurized.

Subsequently, the author together with M. Bock, carried out some pasteurization experiments at the Boitsfort dairy. They used simplified apparatus consisting of a steam generator, and a small metal boiler heated over an open fire; the steam was conducted by a tube to the pasteurizers, properly so-called, which were placed in another room. These consisted of simple vessels of galvanized iron with an internal diameter of about 1 metre, and a depth of 70 cm., having at the bottom, an opening for the admission of the steam, and also a waste-pipe. The experimental data that follow refer to the heating of milk in bottles and jars.

It was found that in order for the pasteurizing process to be carried out satisfactorily, heating, when bottles are used, must be continued from 1½ to 1¾ hours, counting from the first admission of the steam to the end of pasteurization. With jars, 50 to 60 minutes is reckoned to be sufficient. The 19 samples examined all proved satisfactory, the average number of micro-organisms being 472 per cc. In no case were coli bacilli present; the only micro-organisms discovered being spore-forming bacteria.

OTHER ARTICLES ON SCIENCE AND PRACTICE OF AGRICULTURE

On account of lack of space the following articles in the International Review of the Science and Practice of Agriculture can only be referred to. Anyone desiring the articles may obtain them from the Institute Branch, Department of Agriculture, Ottawa.

890.—The World's Synthetic Nitrogenous-Fertilizer-Industry.—I. WABSER, B., Fortschritte der anorganischen Grossindustrie wahrend des Weltkrieges: Stikstoff und seine Verbindungen, in *Chemiker Zeitung*, Year 44, Nos. 102, 105, 108, 110, 116, 122, 124, 127, 128, 129, 130, 134, 135. Bibliography of 589 publications. Gothen, Aug.-Nov., 1920.—II. MEINGAST, R., Die Fortschritte der elektrochemischen Industrie in den Jahren 1916-1919, *Ibid.*, Nos. 150 and 153. Bibliography of 124 publications, Dec., 1920.—III. WICHERN, G., Bericht uber die Fortschritte der Dungemittelindustrie in den Jahren 1913-1920. *Ibid.*, Nos. 10 and 16. Bibliography of 141 publications, Jan.-Feb., 1921.—IV. ESCARD, J., Utilization industrielle de la cyanamide, in *Le phosphate et les engrais chimiques*, Year 30, pp. 110-112. Paris, April, 1921 (12 pages in Institute Bulletin).

894.—Factors Influencing the Assimilation of Fertilizing Matter by the Plant.—WRANGEL, M., in *Die Landwirtshaftlichen Versuch-Stationen*, Vol. XCVI, Pts. 5 and 6, pp. 209-262. Berlin, 1920.

897.—Inheritance of Length of Internode in the Rachis of Barley.—HAYES, H. K., and HARRY, H. V., in *United States Department of Agriculture*, Bulletin No. 869, pp. 1-26. Washington, September, 1920.

898.—Observations and Researches on the Sugar Beet.—MUTTELET, G., in the *Mémoires de la Société Nationale des Sciences*, Series V, Vol. XIII, Part V, pp. 175-322. 274 bibliographic quotations (Bibliographies up to the end of 1919). Reims, 1920.

926.—An Attempt to Induce the Hereditary Transmission of Dourine.—NATTAN-LARRIER, in the *Bulletin de la Société de Pathologie Exotique*, Meeting of May 11, 1921, Vol. XIV, No. 5, pp. 253-260. Paris, May, 1921.

936.—Experiments Made in the United States on the Value of Cottonseed Meal as a Partial Substitute for Grain in a Ration for Horses.—HILL, C. N., and WILLIAMS, J. O., in *United States Department of Agriculture, Bulletin* No. 979, pp. 1-10. Washington, D.C., Dec. 17, 1920.

944.—The Spring International Exhibition of Motorculture, Paris, February 10-20, 1921. —I. ROUSSEAUX, H., in *La vie aux champs*, Sec. 3, No. 11, pp. 6-9. Paris, Jan. 25, 1921.—II. *Bulletin de la Chambre Syndicale de Mots-culture de France*, No. 8, pp. 4-5. Paris, Jan.-March, 1921.—III. PFEFFERTH, P., in *La vie agricole et rurale*, Year 10, Vol. XVIII, No. 15, pp. 229-234. Paris, April 9, 1921.

A High School of Rural Household Economy in Belgium.—DE VUYST, JEANNE, in *International Review of the Science and Practice of Agriculture*, pp. 1217-1220. Rome, October, 1921.

Motorculture in Spain.—BENLLOCH, MIGUEL, in *International Review of the Science and Practice of Agriculture*, pp. 1220-1224. Rome, Italy, October 1922.

972.—The Danger of Using Hydrocyanic Acid for Disinfecting Flour.—MARCHADIER, GOUJON, and DE LAROCHE, in the *Journal de Pharmacie et de Chimie*, Year 113, Series 7, Vol. XXIII, No. 10, pp. 417-430. Paris, May 16, 1921.

974.—Experiments Made in the United States Concerning the Practical Application of X-Ray Examination in the Destruction of Trichinella Spiralis in Infected Meat.—SCHWARTZ, B., in *Journal of Agricultural Research*, Vol. XX, No. 11, pp. 845-854. Washington, March, 1921.

979.—Weather Bureau Activities in California as Applied to the Production of Sugar Beets, Citrus Fruits, Dates and Rice.—PALMER, H. A., in *Monthly Weather Review*, Vol. 49, No. 4, pp. 220-228. Washington, April, 1921.

989.—The Importance of Magnesium Sulphate as a Fertilizer.—JACOB, A., in the *Chemiker Zeitung*, Year XIV, No. 56, pp. 445-447. Cothen, May 10, 1921.

992.—Character and Productivity of Stalrag, a New Kind of Rye Obtained at Svalof by Selection from the Stjernrag.—LJUNG, W. F., in *Sveriges Utsädesförenings Tidskrift*, Year XXXI, No. 3, pp. 95-101. Malmo, 1921.

993.—Experiments in Crossing Different Species of Barley in the United States.—MALLOCH, A. S., in *The American Naturalist*, Vol. LV, No. 638, pp. 281-286. Lancaster, Pa., May-June, 1921.

999.—Observations on the Wheats of Libia.—SCALETTA, H., in the *Giornale di Agricoltura della Domenica*, Vol. XXXI, No. 30, p. 235. Piacenza, July 24, 1921.

1000.—Trials of Strampelli Wheats in Italy.—JOSA, G., in *l'Italia Agricola*, Year 58, No. 6, pp. 163-171. Piacenza, June 15, 1921.

1001.—Topping of Wheat.—SUCCI, A., in *l'Italia agricola*, Vol. 58, No. 7, pp. 197-204. Piacenza, July 15, 1921.

1025.—Determination of the Amount of Assimilation Energy Necessary for the Production of Meat and Fat in Young Pigs; Experiments in Germany.—WELLMANN, O., in the *Deutsche Landwirtschaftliche Presse*, Year XLVIII, No. 43, pp. 325-326. Berlin, June 1, 1921.

1028.—Notes on the Inheritance of Colour and Markings in Pedigree Hereford Cattle in England.—PITT, F., in *Journal of Genetics*, Vol. IX, No. 3, pp. 281-302. Bibliography of 12 works.

1031.—Study of the Cattle-Breeding Situation in South America (Brazil, Uruguay, (Argentina) Especially as Regards a Possible Market for Swiss Cattle.—LUTHY, G., in the *Annuaire Agricole de la Suisse*, Year XXII, vol. 2, pp. 49-70. Lucerne, 1921.

1034.—Experiments Made in the United States on the Respective Values of Green Feeds as a Preventive of Intestinal Disorders of Growing Chickens.—PHILLIPS, A. G., CARR, R. H., KENNARD, D. C., in *Journal of Agricultural Research*, Vol. XX, No. 11, pp. 869-873. Washington, D.C., March, 1921.

1048.—Experiments in Drying Green Peas.—MESSINA, M., in the *Revista di Agricoltura*, Vol. XXVI, No. 27, pp. 384-386; No. 28, pp. 396-398. Parma, July 8 and 15, 1921.

1051.—**Storage of Vegetables.**—DIFFLOTH, P., in *La Vie Agricole et Rurale*, Year 10, Vol. XVIII, No. 19, pp. 293-297. Bibliography of 4 works. Paris, May 7, 1921.

1053.—**Storing Sweet Potatoes in Trinidad.**—BRUNTON, L. A., in *Bulletin of Department of Agriculture, Trinidad and Tobago*, Vol. XIX, Pt. 2, pp. 88. Port of Spain, 1921.

1070.—**Leafy Spurge (Tithymalus Esula Euphorbia Esula) Harmful Weed in the United States.**—BRITTON, N. L., in *Journal of the New York Botanical Garden*, Vol. XXII, No. 256, pp. 73-75. Lancaster, Pa., April, 1921.

1072.—**On the Resistance of the Adult Cockchafer to High and Low Temperatures.**—FAES, H., and STAEHELIN, M., in the *Compies rendus hebdomadaires des Seances de l'Academie des Sciences*, Vol. CLXXII, No. 1, pp. 61-64. Paris, 1921.

1074.—**The Introduction Into Southern France of the Australian Coccinellid, Cryptolaemus Montrouzieri, a Natural Enemy of Scale Insects (*Pseudococcus*).**—MARCHAL, P., in the *Comptes rendus hebdomadaires des seances de l'Academie des Sciences.* Vol. CLXXII, No. 2, pp. 105-107. Paris, 1921.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS.

The following is a brief indication of the contents of the more important articles in the March-April number of the Institute Bulletin. Persons interested in any of the articles may obtain the original Bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

The Encouragement of Agricultural Co-operation During and Since the War in Great Britain and Ireland.—22 pages.

For some years previous to the war it had been part of the settled policy of the British Government to give encouragement to agricultural co-operation. This policy found expression in the sections introduced into various Acts of Parliament, such as the Small Holdings and Allotments Acts of 1907 and 1908, the Development and Road Improvement Funds Act, 1911, and the Small Landholders (Scotland) Act, 1911, authorizing grants to be made for its encouragement out of State funds. The war brought about no very striking development of this policy though some large special grants were given either during the war or immediately after the cessation of hostilities. It did, however, result in a more general recognition by the Government of the importance of agricultural co-operation, as was evidenced by the speeches of the Ministers and by the recommendations of various committees of inquiry. Moreover, for the solution of certain problems connected with the food supply, co-operative methods were adopted on the initiative of the Government itself.

The article gives a statement of the financial encouragement given by the State to the promotion of agricultural co-operation, an account of the special application of co-operative methods to war-time problems, and an account of the State encouragement which, though not originally a war measure, was continued during the war.

Measures Adopted in Italy During the War to Encourage Agricultural Co-operation.—42 pages.

In the early part of the war, owing to the general mobilization which deprived all undertakings of their youngest and strongest employees and to the concentration of all efforts and all energies on the immediate object of preparation for carrying on the war, the co-operative movement in Italy had a temporary set-back and was almost brought to a standstill. Subsequently, however, when it became necessary to take steps to ensure the food supply and to strengthen the economic resistance of the country, the policy followed by the Government in regard to the production and distribution of food stuffs and to public works, agricultural credit and home colonization, contributed in no small degree to the development of co-operative distributive societies, co-operative societies for production and labour, and agricultural co-operative societies, which, already numerous in Northern and Central Italy, have spread also in Southern Italy. After the cessation of hostilities, the necessity of speeding up the resumption of the normal productive activity gave rise everywhere to new and fruitful enterprises, in which co-operation could not fail to play an important part, and thus co-operation, encouraged as it was by adequate State-aid, became a powerful instrument for the economic reconstruction of Italy.

The present article describes the different provisions which were made between 1914 and 1920 for the encouragement of co-operation.

Agricultural Credit in France During the War.—6 pp. There has been in France

little development of agricultural credit other than co-operative. This is due to the fact that the needs of agriculturists are effectively met by co-operative credit, for which capital has been provided on a large scale. Even in dealing with matters apparently in no way germane to co-operative credit, such as loans for the purchase of small holdings granted to ex-service men in receipt of pensions or to civilian sufferers by the war, the State also grants credit through the medium of co-operative banks, with the aim of thus enrolling fresh support for the cause of co-operative credit.

Non-co-operative credit has been employed in two directions only as an outcome of the war:

1. Advances of compensation due for damage resulting from the war.

2. Loans for recultivation of abandoned lands.

These loans are discussed in detail in the article.

Measures Taken in Austria During the War to Maintain the Supply of Agricultural Labour.—15 pages. Describes the harvest commissions and labour exchanges, and gives an account of the agricultural work of soldiers temporarily detached, the utilization of the work of wounded men, prisoners' labour, employment of schoolchildren and refugees, etc.

The Maintenance of the Supply of Agricultural Labour in England During the War.—29 pages. The second installment of this article. It gives an account of the use of soldier labour, and of the employment of interned civilians and prisoners of war.

Other articles in the March-April number are: The Danish Co-operative Egg Export Society Since the War; Guiding Principles for the Formation of Co-operative Agricultural Credit Banks; Co-operative Dairies in Holland in 1920; Mortgage Credit in Holland in 1920; The American Live Stock Loan Pool; the Law Relating to Agricultural Pledges in Uruguay.

AGRICULTURAL STATISTICS

FOREIGN CROP SUMMARY

(August 21, 1922)

United Kingdom.—The weather was unsettled and showery during the last part of July, but improved early in August when harvesting was general. The wheat crop of England and Wales is provisionally estimated as 63,000,000 bushels compared with 70,000,000 last year.

France.—Weather was favourable during the month of July. At the middle of August good progress had been made with the harvest, but the yield of wheat was officially stated to be below average.

Italy.—Conditions for harvesting were favourable. The production of wheat is officially estimated as 162,000,000 bushels against 192,000,000 last year. The quality is reported to be good.

Germany.—In the first part of July rains were abundant but came too late to benefit the cereal crops. Harvesting was late on account of the backwardness of vegetation. The wheat yield is officially reported to be below average.

Czechoslovakia.—July weather was favourable, but harvesting was late on account of the backwardness of the crops. The latest reports indicate a yield less than that of last year.

Jugoslavia.—Weather was favourable in July and the wheat crop was expected to be larger than that of last year.

Roumania.—Dry, hot weather prevailed during harvest which was practically completed on the first of August. Wheat and rye were expected to show good yields.

Russia.—According to Broomhall it has been authoritatively stated that the grain crop of Russia this year will be sufficient to meet the requirements of the population. The condition of the crops is reported to be good.

North Africa.—The wheat crop in Upper and Middle Egypt was reported to be above average, and below average in Lower Egypt. The combined wheat crops of Algeria, Tunis and Morocco are estimated as 30,000,000 bushels compared with 62,000,000 last year.

India.—According to the latest report from the Viceroy the agricultural situation was generally good. Over most of the country the monsoon was good and well distributed. Although the wheat crop of last spring was 366,000,000 bushels against 247,000,000 the previous year, the embargo against the export of wheat has not yet been lifted.

Argentina.—Rains were general during the last week in June and the first week in July. Where floods did not occur, the rains benefitted the wheat and flaxseed which by July 7th was nearly all sown in the north, although ploughing and sowing were still active in the south. By the third week in July field work was becoming difficult. According to latest reports the outlook was regarded as promising.

Australia.—Extensive rains fell in New South Wales in the latter part of July. The outlook generally was only fair on account of lack of moisture early in the season.

WORLD'S PRODUCTION OF WHEAT

European countries as at present	1922	1921	Average 1916-20	Pre-war average 1909-13	European countries as before the war
	Bushels	Bushels	Bushels	Bushels	
Great Britain and Ireland	67,000,000*	73,795,000	68,681,000	59,640,000	Great Britain and Ireland.
France	264,000,000	315,068,000	209,249,000	317,639,000	France.
Belgium	10,186,000*	14,495,000	7,452,000	14,894,000	Belgium.
Netherlands	5,218,000*	8,686,000	5,006,000	4,896,000	Netherlands.
Denmark	7,000,000	11,207,000	5,997,000	5,344,000	Denmark.
Norway	750,000	972,000	781,000	306,000	Norway.
Sweden	8,230,000*	12,577,000	8,947,000	8,103,000	Sweden.
Finland	297,000*	280,000	254,000	251,000	Finland.
Spain	125,908,000*	145,151,000	139,715,000	130,447,000	Spain.
Portugal	7,500,000	8,613,000	8,597,000	6,985,000	Portugal.
Italy	162,407,000*	192,838,000	168,187,000	183,336,000	Italy.
Switzerland	3,748,000*	5,284,000	6,029,000	3,314,000	Switzerland.
Luxembourg	500,000	661,000	781,000	615,000	Luxemburg.
Germany	86,000,000	107,800,000	81,143,000		
Alsace-Lorraine	6,000,000	7,702,000	3,763,000	152,120,000	Germany.
Poland (new)	44,364,000*	35,576,000	22,741,000	19,045,000	Poland (Russian).
Czecho-Slovakia	35,000,000	40,674,000	26,362,000		
Austria	5,000,000	6,452,000	5,269,000	60,842,000	Austria.
Hungary	45,754,000*	52,716,000	38,295,000	169,645,000	Hungary.
Roumania	80,000,000	75,592,000	61,310,000	87,792,000	Roumania.
Jugo-Slavia	55,000,000	51,867,000	43,001,000	14,746,000	Serbia.
Bulgaria	34,343,000*	42,510,000	30,000,000	41,994,000	Bulgaria.
Greece	9,553,000*	11,170,000	11,001,000	9,400,000	Greece.
Total Europe	1,063,758,000	1,221,686,000	952,561,000	1,291,354,000	

Countries	1922	1921	Average	Pre-war average 1909-13
	Bushels	Bushels	Bushels	Bushels
NORTH AMERICA—				
Canada	320,968,000*	300,858,000	228,410,000	197,118,000
United States	805,000,000*	794,893,000	799,000,000	686,697,000
Total North America	1,125,968,000	1,095,751,000	1,027,410,000	883,815,000
ASIA—				
India	366,539,000*	247,072,000	344,736,000	351,767,000
Japan	26,495,000*	26,921,000	30,246,000	24,166,000
Total Asia	393,034,000	273,993,000	374,982,000	375,933,000
AFRICA—				
Algeria	16,902,000*	33,764,000	25,730,000	34,998,000
Egypt	32,000,000	37,011,000	32,073,000	34,121,000
Morocco	9,533,000*	17,466,000	19,025,000	18,202,000
Tunis	3,307,000*	10,623,000	7,395,000	6,224,000
South Africa	8,000,000	8,689,000	7,304,000	6,127,000
Total Africa	69,742,000	107,553,000	91,527,000	99,672,000
SOUTH AMERICA—				
Argentina	171,000,000	154,875,000	171,017,000	147,072,000
Chili	22,000,000	22,179,000	21,801,000	21,243,000
Uruguay	12,000,000	12,125,000	7,811,000	6,519,000
Total South America	205,000,000	189,179,000	200,629,000	174,834,000
AUSTRALASIA—				
Australia	107,000,000	136,168,000	106,637,000	90,500,000
New Zealand	8,000,000	10,500,000	5,978,000	7,070,000
Total Australasia	115,000,000	146,668,000	112,615,000	97,570,000
World's Total	2,972,502,000	3,034,830,000	2,759,724,000	2,923,178,000

*The figures in the 1922 column followed by an asterisk are official, the others are estimates based on acreage and condition reports.

The striking feature of the statistical situation of wheat as disclosed in the above table is the reduction in the production of the countries of Europe. The indications are that the total wheat crop of Europe will be about 160,000,000 bushels less than that of last year. Besides, there is a reduction of 38,000,000 in North Africa. The European total is also 228,000,000 bushels less than the pre-war average.

In considering the world's totals it must be remembered that the harvest in the southern hemisphere will not take place until December. In making estimates for Argentina and Australia and other southern countries it is assumed that average crops will be harvested.

In spite of the increase of 30,000,000 bushels in North America and 120,000,000 in Asia the indicated world's total is 63,000,000 bushels less than last year.

ACREAGE AND PRODUCTION OF RYE, BARLEY AND OATS

RYE

Countries	Area			Production		
	1922	1921	Average 1916–20	1922	1921	Average 1916–20
	Acres	Acres	Acres	Bushels	Bushels	Bushels
Belgium	580,000	559,000	441,000	18,598,000	21,273,000	9,742,000
Bulgaria	481,000	489,000	464,000	8,761,000	8,390,000	6,056,000
Spain	1,702,000	1,786,000	1,815,000	27,340,000	28,118,000	26,911,000
Jugo-Slavia	369,000	471,000	489,000		5,770,000	6,091,000
Finland	588,000	606,000	592,000	7,669,000	10,385,000	9,422,000
France	2,087,000	2,163,000	2,079,000		44,494,000	35,535,000
Greece	198,000	222,000	106,000	2,362,000	3,151,000	1,241,000
Hungary	1,340,000	1,370,000	1,475,000	19,695,000	23,177,000	20,564,000
Italy	284,000	287,000	278,000		5,634,000	4,829,000
Netherlands		492,000	485,000		16,646,000	13,096,000
Poland	10,879,000	8,838,000	7,236,000	201,534,000	167,217,000	73,660,000
Sweden		913,000	903,000		27,812,000	20,039,000
Roumania	533,000	807,000	780,000		8,813,000	9,445,000
Switzerland	57,000	57,000	53,000		1,800,000	1,559,000
Czecho-Slovakia	2,160,000	2,183,000	2,238,000		54,382,000	32,942,000
Canada	2,480,000	1,843,000	464,000	37,848,000	21,455,000	7,350,000
United States	5,148,000	4,228,000	4,927,000	79,600,000	57,918,000	67,773,000

BARLEY

Countries	Area			Production		
	1922	1921	Average 1916–20	1922	1921	Average 1916–20
	Acres	Acres	Acres	Bushels	Bushels	Bushels
Belgium	86,000	96,000	84,000	3,991,000	5,117,000	3,900,000
Bulgaria	554,000	551,000	554,000	12,061,000	13,241,000	9,451,000
Spain	4,215,000	4,335,000	4,135,000	74,795,000	89,321,000	85,518,000
Jugo-Slavia	484,000	924,000	926,000		13,274,000	13,199,000
Finland	295,000	296,000	287,000	5,029,000	5,939,000	4,771,000
France	1,425,000	1,648,000	1,571,000		37,805,000	32,334,000
Greece			496,000		6,430,000	6,230,000
Hungary	1,180,000	1,187,000	1,266,000		21,408,000	22,586,000
Italy	544,000	540,000	503,000		10,362,000	8,283,000
Netherlands		62,000	57,000		3,651,000	2,452,000
Poland	2,484,000	2,430,000	1,944,000	62,905,000	53,306,000	38,567,000
Roumania	3,569,000	3,878,000	3,460,000		49,404,000	67,606,000
Sweden		400,000	424,000		12,326,000	12,070,000
Switzerland	16,000	16,000	19,000		552,000	637,000
Czecho-Slovakia	1,686,000	1,585,000	1,717,000		47,365,000	37,238,000
Canada	2,132,000	2,796,000	2,209,000	64,881,000	59,709,000	58,962,000
United States	7,550,000	7,240,000	8,150,000	191,507,000	151,181,000	197,443,000
Japan		2,929,000	2,941,000	85,849,000	87,883,000	93,648,000
Algeria	2,384,000	2,508,000	2,829,000	18,886,000	48,226,000	36,772,000
Morocco	2,150,000	1,905,000	2,147,000	22,506,000	29,510,000	33,093,000
Tunis	667,000	1,230,000	1,173,000	1,847,000	11,482,000	6,788,000

OATS

Countries	Area			Production		
	1922	1921	Average 1916–20	1922	1921	Average 1916–20
	Acres	Acres	Acres	Bushels	Bushels	Bushels
Belgium	701,000	604,000	573,000	29,327,000	33,153,000	21,076,000
Bulgaria	367,000	407,000	345,000	10,797,000	10,609,000	6,592,000
Spain	1,512,000	1,575,000	1,497,000	32,871,000	33,521,000	31,320,000
Jugo-Slavia	103,000	1,021,000	1,027,000	.....	17,327,000	20,938,000
Finland	988,000	1,038,000	1,069,000	26,164,000	26,380,000	22,898,000
France	7,905,000	8,328,000	7,787,000	.....	230,786,000	214,423,000
Greece	.....	.....	243,000	.....	3,891,000	3,681,000
Hungary	818,000	807,000	802,000	.....	20,672,000	20,995,000
Italy	1,186,000	1,199,000	1,143,000	.....	35,553,000	30,915,000
Netherlands	.....	378,000	381,000	.....	20,036,000	19,966,000
Poland	5,718,000	4,738,000	4,119,000	178,549,000	140,979,000	121,471,000
Roumania	2,637,000	3,062,000	2,388,000	.....	58,432,000	64,329,000
Sweden	.....	1,757,000	1,836,000	.....	72,093,000	65,412,000
Switzerland	52,000	53,000	67,000	.....	2,857,000	3,653,000
Czecho-Slovakia	2,031,000	2,003,000	1,981,000	.....	28,097,000	56,145,000
Canada	17,189,000	16,949,000	13,981,000	509,752,000	426,232,000	432,924,000
United States	41,822,000	44,826,000	42,456,000	1,251,156,000	1,060,737,000	1,329,518,000
Japan	.....	.....	189,000	10,841,000	11,375,000	7,317,000
Algeria	596,000	558,000	587,000	5,239,000	9,726,000	13,347,000
Tunis	119,000	165,000	153,000	908,000	3,891,000	2,886,000

NORTH AMERICAN CROPS

The North American crops this year show a wonderfully fine condition compared with last year, with the finest crops in Canada since 1915.

	1922	1921	Changes	
Wheat—				
United States	805,000,000	795,000,000	Inc.	10,000,000
Canada	321,000,000	301,000,000	"	20,000,000
Total	1,126,000,000	1,096,000,000	"	30,000,000
Oats—				
United States	1,251,000,000	1,061,000,000	"	190,000,000
Canada	510,000,000	466,000,000	"	44,000,000
Total	1,761,000,000	1,527,000,000	"	234,000,000
Rye—				
United States	79,600,000	57,900,000	"	21,700,000
Canada	37,800,000	21,400,000	"	16,400,000
Total	117,400,000	79,300,000	"	38,100,000
Hay—				
United States	110,300,000	96,800,000	"	13,500,000
Canada	15,500,000	11,400,000	"	4,100,000
Total, tons	125,800,000	108,200,000	"	17,600,000
Potatoes—				
United States	440,000,000	347,000,000	"	93,000,000
Canada	103,000,000	107,000,000	Dec.	4,000,000
Total	543,000,000	454,000,000	Inc.	89,000,000

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Deputy Minister.....J. H. Grisdale, B. Agr., D.A.Sc.

Commissioner, Dept. of Agriculture.....Duncan Marshall.

Assistant Deputy Minister and Secretary....Lt.-Col. A. L. F. Jarvis, I.S.O

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Functions—To administer the Central Experimental Farm at Ottawa, twenty-one branch farms, eight sub-stations, eighty-six illustration stations, and two tobacco stations. The divisions of work are: Administrative, Chemistry, Horticulture, Cereals, Poultry, Animal Husbandry, Forage Plants, Bee, Tobacco, Botany, Field Husbandry, Flax, Illustration Stations, and Extension and Publicity.

Health of Animals Branch.....Veterinary Director General, Frederick Torrance, B.A.,D.V.S.

Functions—To administer enactments for the protection of live stock from contagious diseases, and to inspect meats, meat products and canned foods; to conduct research work.

Live Stock Branch.....Commissioner, H.S. Arkell, M.A., B.S.A.

Functions—To develop the live stock industry through the use of superior stock; to improve marketing facilities.

Dairy and Cold Storage Branch.....Commissioner, J. A. Ruddick.

Functions—To develop the dairy industry; to inspect public cold storage warehouses; to carry on shipping experiments; to administer Dairy enactments.

Seed Branch.....Commissioner, George H. Clark, B.S.A.

Functions—To encourage the production and use of pure seed; to test and inspect seed; to inspect feed manufacturing plants; to supply seed in case of shortage.

Entomological Branch.....Dominion Entomologist, Arthur Gibson, F.E.S., F.E.S.A.

Functions—To investigate injurious insects and methods of control; to enforce the Destructive Inspect and Pest Act.

Fruit Branch.....Commissioner, (Acting), G. E. McIntosh.

Functions—To develop the fruit industry; to enforce the Inspection and Sales Act as it relates to fruit, fruit packages and potatoes; to adjust transportation difficulties.

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Functions—To represent Canada at the International Institute of Agriculture at Rome; to publish world agricultural information and statistics; to maintain the departmental library.

Agricultural Instruction Act Branch..Commissioner, (Acting), J. H. Grisdale, B. Agr., D.A. Sc.

Functions—To administer the Agricultural Instruction Act, and to report upon the work carried on by the provinces under its provisions.

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Functions.—To publish "The Agricultural Gazette;" to distribute departmental publications; to prepare and issue other publicity matter.